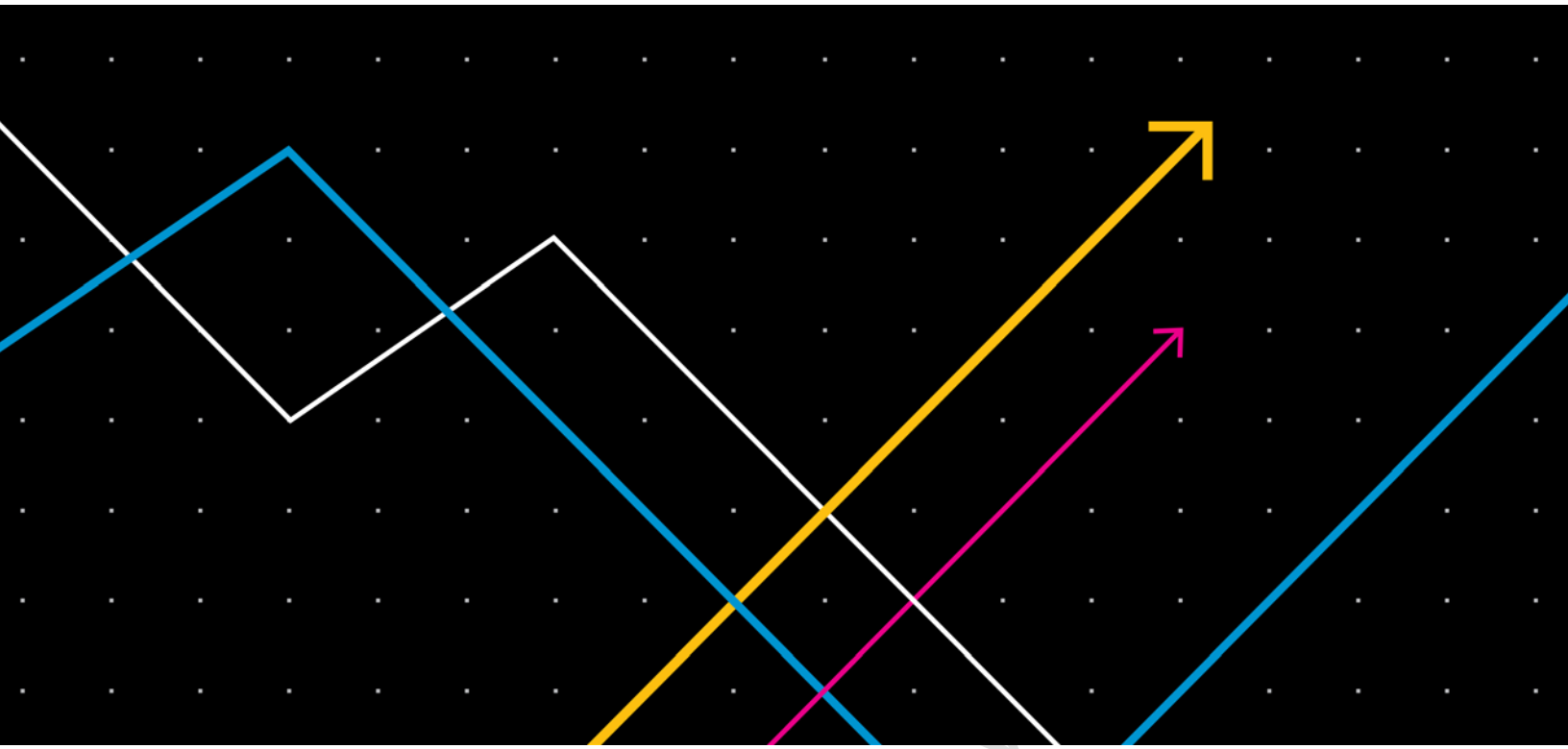

OUTSIDE LEARNING FOR VALLEY CERF

Exploring Options for Economic Competitiveness and Resilience, Equity, and Climate Action in the Central San Joaquin Valley

Economic Frameworks and Industry Clusters

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Executive Summary

In 2022, California's Governor's Office of Planning and Research (OPR), Office of Business and Economic Development (GO-Biz), and the California Labor Workforce Development Agency (LWDA) launched the $600 million Community Economic Resilience Fund (CERF). The aim of CERF is to support the development of new plans and strategies to advance competitive and resilient economies that center equity and climate action in each of the state's 13 regions. To achieve CERF's desired outcomes for long-term economic resilience in the transition to a carbon-neutral economy across California, regional backbone organizations are being funded to convene and engage diverse stakeholders in a highly participatory planning process. The Central Valley Community Foundation (CVCF) is leading the effort for the Central San Joaquin Valley CERF (Valley CERF), in partnership with three local conveners—the Office of Community and Economic Development (OECD) at Fresno State, United Way Fresno and Madera Counties, and the Workforce Investment Board (WIB) of Tulare County—and a coalition of more than 100 organizations in the region's four counties of Fresno, Kings, Madera, and Tulare.

Effective planning efforts must be grounded in evidence, including for strategies to advance economic competitiveness and resilience, equity, and climate action. The Urban Institute (Urban) has been contracted by CVCF to support Valley CERF with some of the evidence it needs to consider to achieve CERF's desired outcomes. As part of this work, Urban gathered information on several proven and promising economic frameworks and industry clusters that are relevant to CERF's goal of simultaneously advancing economic competitiveness and resilience, equity, and climate action, and that are relevant to the context in the Valley CERF region. We summarize our findings by introducing the economic frameworks and industry clusters analyzed, and exploring alignments and distinctions within their key features and benefits, key policies and other levers that help advance them, and opportunities and considerations for Valley CERF. The economic frameworks explored are local, triple bottom line, cooperative, circular, fair trade, and doughnut; and the industry clusters explored are clean energy, responsible food systems, "One Water" management, and circular manufacturing.

To assess the evidence base for each of the industry clusters and economic frameworks, Urban conducted a review of peer-reviewed and practitioner literature for relevant publications, especially those that spoke to implementation and outcomes. To expand on the literature, Urban conducted 34 interviews with experts and movement leaders, each with deep knowledge of at least one of the

economic clusters and industries; experts and leaders were representatives from local, regional, and national scale efforts, as well as from the government, non-profit, and private sectors. Urban also gathered evidence on the current size of the clean energy, food, water, and manufacturing industries in the region.

The CERF Outside Learning Report on economic frameworks and industry clusters is intended to be used in combination with the Regional Plan Part 1, which includes a Baseline Assessment of the Valley CERF region, a Climate and Environmental Analysis, and a SWOT analysis. While the Regional Plan Part 1 provides insights to the context in the region as it is now, this report explores possibilities for the future that Valley CERF can incorporate into its thinking. The combination of all findings is intended to inform the Valley CERF coalition's High Road Economy Transition Plan and Road Map, which will contain the coalition's recommendations to the state of California for the strategic investments the region is prioritizing to advance climate-forward industries, diversify regional economies, and ensure equitable access to high quality jobs. This report may also be of use to the state's CERF program partners in evaluating the recommendations in Valley CERF's High Road Economy Transition Plan and Road Map for funding in the Implementation Phase.

Key Findings

ECONOMIC FRAMEWORKS

An economic framework is a type of social system focused on production, distribution, and exchange of goods and services. Values and principles inform the policies that create and perpetuate the economic framework—and thus the social system—and drive behavior. Capitalism is the dominant economic framework in the US and around the world, but there are many other economic frameworks that co-exist with capitalism, each of which vary in how prominent and established they are. We explored six: local, triple bottom line, cooperative, circular, fair trade, and Doughnut. We chose these because they each aim to balance the wellbeing of people and the planet with economic health and resilience, and so, would help the region advance CERF goals. While the key elements for each economic framework are distinct and vary in the degree to which they balance the wellbeing of people and the planet with economic health, there are common themes across all six:

- *Mutually reinforcing pillars*: Evidence shows that the relationship between economic health and resilience, equity, and ecological health is strongly mutually reinforcing, not mutually exclusive. This mutually reinforcing relationship is assumed across the six economic frameworks.

- *Interdependent Relationships:* Several of the economic frameworks feature self-reliant but interdependent communities, including through practices like cooperation and fair trade.
- *Redefining success from growth to development*: Economic success is redefined, with a focus on economic development instead of growth. Economic development focuses on improving well-being and quality of life. Although shifting to prioritizing economic development over economic growth better enables equitable and ecologically sound outcomes, intentional efforts are still needed to achieve them.
- *Healing and repair*: There is a shared acknowledgement of the degree of harms to people and planet, including rising inequalities as well as the current and projected impacts of climate change. Some also take the position that, because of the degree of harms, it's not sufficient to simply 'move forward better' and explicitly call for healing and repair to rebalance things like wealth and power as well as ecological systems and planetary health.
- *Systems change*: While the six economic frameworks vary in their scale and scalability, each aims for systems change in policy and practice as a way to address intersecting economic, equity, and climate challenges.
- *Role of public and private sectors*: Each economic framework differs in how it approaches the role of the public and private sectors, but each requires the leadership and active participation of both.
- *Transparency, accountability, and learning*: When measuring and reporting are used well—and not punitively—they can support trust and a learning culture in which the work is seen as an ongoing practice, such that progress is regularly assessed and corrective actions are taken as needed to improve outcomes.

The body of evidence exploring the benefits for each economic framework varies in breadth and depth as well as proof versus promise. However, there are common benefits that support CERF goals for economic competitiveness and resilience, climate action and environmental health, and equity:

- *Economic competitiveness and resilience:*
  - Investments in diverse local business communities, the well-being of employees and communities, local and ethical supply chains, and ecological health, result in more and higher quality jobs; more economic stability for workers, businesses, and economies—be that through regular market volatility or acute economic shocks—and a stronger likelihood of thriving over the long term.

    - Quality jobs pay fair wages; provide other compensation like paid time off, healthcare, and retirement benefits; provide safe working conditions; offer fair schedules and other aspects of job security; and more. These are all important elements of upward mobility, as are other benefits of the frameworks, such as environmental quality and economic inclusion.
    - The character and identity of a place is heavily intertwined with its business community. Each of the economic frameworks, in their own ways, acknowledges this relationship, and demonstrates the community and economic development benefits of empowering people to shape their place.
- *Climate action and environment*:
    - Nearly all the economic frameworks explicitly embed principles related to climate action and environmental health, both in terms of minimizing further ecological harms and repairing the harms that have already been done. These embedded values, and the practices that stem from them, result in a suite of proven and promising benefits related to reduced greenhouse emissions; energy efficiency and water conservation; reduced pollution and waste; improved air, water, and soil quality; adaptation to the current and forecasted impacts of climate change; and ecological restoration.
- *Equity:*
    - Participation in economic decision-making, be that through community and economic development planning and implementation, cooperative ownership of a business, or the ability to unionize, supports economic democracy.
    - With intentional efforts and investments, the promise of improved outcomes for underrepresented business owners and workers is shared across several of the economic frameworks.

Policies and other levers that help advance the economic frameworks include:

- *Planning*: Local and regional plans, especially those meant to be comprehensive, provide an important north star, codifying priorities and goals and guiding activities in a place for many years.
- *Procurement and other financial incentives*: Mandating socially and environmental responsible standards in business practices can drive behavior change in all corners of the private sector.

Financial incentives can also help by rewarding desired behavior and deterring undesired behavior. For prospective contractors to government and anchor institutions, procurement preferences create strong rewarding incentives.

- *Business Development*: All businesses, regardless of their size, stage, or industry, can benefit from capital, training and technical assistance, peer support, and other business development supports. This is especially true for smaller businesses, women- and minority-owned businesses, and cooperatively owned businesses.
- *Resourcing backbone organizations:* Fostering and resourcing backbone organizations that provide training and technical assistance, peer support, and other business support services is key part of a supportive economic ecosystem.
- *Narrative Change*: Another lever is shifting public discourse about the goals of an economy, how success is measured towards those goals, and what actions are needed to ensure positive outcomes for people, planet, and prosperity.

INDUSTRY CLUSTERS

An industry can be defined as a particular type or sector of productive work, trade, or manufacture, which could include products and services. An industry cluster is a regional concentration of related industries. The network of economic relationships can create a competitive advantage for the related firms in a particular region. This advantage can be an enticement for other businesses in those industries to develop or relocate to a region. We explored four industry clusters: clean energy, responsible food systems, one-water resource management, and circular manufacturing.

These four industry clusters were selected based on several factors related to regional context, including current prevalence and market trends, policy trends, climate trends, aligned federal and state investments, and compatibility with CERF goals. For example, each has a presence in the Valley CERF region; helps to meet basic human needs; is positioned to support diverse locally owned businesses and quality local jobs; can help reduce GHG emissions, pollution, and waste and thus improve air, water, and soil quality as well as public health; and are reflected federal and state policy priorities and investments.

- **Clean Energy** encompasses energy that comes renewable sources that, when used, do not emit GHG or pollute the air, as well as energy efficiency measures that save energy. It generally includes six different sectors: renewable energy, energy efficiency, clean vehicles, transmission and distribution, storage, and grid modernization.

Unprecedented levels of investments in clean energy, such as the hundreds of billions of dollars currently flowing from the Infrastructure Investment and Jobs Act and the Inflation Reduction Act, are being driven by the need to mitigate further climate change and build resilience into energy infrastructure in the face of current climate change. These funds are available to states and localities. California's policies and investments are also driving significant investments in clean energy.

The Central San Joaquin Valley is already a player in the clean energy economy, and so has relevant knowledge and assets that position it well for a continued integral role in moving forward the state's plans to reach carbon neutrality by 2045.

An industry cluster could leverage federal and state policies and investments as well as regional assets to design, manufacture, and distribute products, services, and technologies that support the advancement of renewable energy, energy efficiency, storage and grid modernization, and/or clean vehicles. Academic, non-profit, and workforce partners are also critical.

- **Responsible Food Systems** span production, processing and manufacturing, distribution, wholesale and retail, hospitality, and waste and recovery operations; and embed socially and environmentally responsible practices throughout the food supply and value chain. For example, they aim to provide quality, family-supporting jobs; build and maintain stable, local, and ethical supply chains and markets; ensure that fresh and healthy foods are accessible and affordable, especially in historically underserved areas; minimize food waste; sustainably use land, water, and energy resources for the long-term.

  Largely driven by the fact that the food system is both a large contributor to and at risk from climate change, there are strong global, national, and regional trends in support of responsible food systems, which can manifest as a responsible food industry cluster at a local or regional scale. For example, in the US, the Biden-Harris Administration has committed to building sustainable and resilient food systems, and is investing more than $10 billion in food systems transformation over the course of the next several years.

  The combination of the size and scale of the current food economy in the Central San Joaquin Valley, its relationship to climate change, the current poor job quality it supports, and federal funding create a significant need and opportunity for the Valley CERF region to develop a responsible food industry cluster.

An industry cluster could leverage federal and state policies and investments as well as regional assets, inclusive of its strong agricultural sector and food and beverage manufacturing sector, to design, manufacture, and distribute products, services, and technologies that support the advancement of a responsible food system. Academic, non-profit, and workforce partners are also critical.

- **One Water Management** is an integrated approach to water resources management informed by the fact that all water is part of one water cycle, which itself is impacted by land use.

  There are global, national, and regional trends showing uptake of One Water principles and aspects of the approach, which can manifest as an industry cluster at a local or regional scale. In the US, its champions include the EPA and a national network of local practitioners in water resources management. Further, the Infrastructure Investment and Jobs Act includes a rare federal injection of more than $50 billion for water infrastructure. Grants through California's Integrated Regional Water Management program have been available since 2002 and support One Water-related efforts across California.

  The large presence of agriculture, manufacturing, and other heavily water-dependent industries; the Valley CERF region's unique water challenges and climate forecasts; and the Valley CERF coalition itself, which includes representation from relevant business and industry groups, environmental groups, and local governments from across the region create favorable conditions for a One Water management approach.

  An industry cluster could leverage federal and state policy and investments, as well as regional assets, and include public and private actors that provide products and services related to planning and administration, land use and siting, engineering and design, materials manufacturing and supply, building and construction, treatment, operations and maintenance, and monitoring and testing, among other activities; as well as academic, non-profit, and workforce partners. Given the increasing prevalence of 'hotter and drier' climate forecasts in the Valley CERF and other areas of the US, a One Water management industry cluster could also position the region to become a national expert.

- **Circular manufacturing** is an alternative to the linear manufacturing model of 'take-make-use-dispose.' Products and their parts are designed for re-use; and are made with renewable and recoverable inputs; and byproducts and excess from the manufacturing process are valued and repurposed as inputs for other products or processes.

Circular manufacturing models are being explored globally, in the United States, and in California, including in cement, plastics, wood products, textiles, and agriculture. In the US, agencies across the federal government are investing in infrastructure, technologies, and materials that are aligned with circular manufacturing principles and practices. California also has several laws that support aspects of circular manufacturing. In the private sector, sustainability and supply chain resilience are noted as top priorities among US manufacturers.

The size and scale of the region's current manufacturing industry, priorities expressed from leaders in the manufacturing industry, and federal and state legislation and funding all point to an opportunity for Valley CERF to develop a circular manufacturing industry cluster.

An industry cluster could leverage federal and state policies and investments as well as regional assets to design, manufacture, and distribute products, services, and technologies that support the advancement of circular manufacturing. Academic, non-profit, and workforce partners are also critical.

To ensure the full extent of the economic, equity, and climate goals outlined for Valley CERF and the industry clusters, Valley CERF can embed principles and practices from the economic frameworks presented. The interactions and overlaps between and across the six economic frameworks invite Valley CERF to see the principles as a menu to learn from and apply in place; and the interactions and overlaps between and across the industry clusters invite Valley CERF to explore opportunities to strengthen one cluster with another. Further, the economic frameworks and industry clusters are mutually beneficial, reinforcing the importance of pairing them in the Valley CERF region. While industry clusters can focus on providing products and services locally, exporting them, or a mix, the success of any industry cluster is dependent on a robust local network of varied but related businesses. The economic frameworks and industries each acknowledge—and benefit from—regionality and a cooperative relationship between urban and rural areas. Further, expanding any of these industries into a robust industry cluster also demands a regional approach.

Economic Frameworks

In this section, we introduce and summarize the level of proven and promising evidence regarding six distinct and complementary economic frameworks to assess the potential to advance CERF's goals of economic competitiveness and resilience, equity, and climate action in the Central San Joaquin Valley, California. A summary is provided for each of the following:

- A) Local Economies
- B) Triple Bottom Line Economies
- C) Cooperative Economies
- D) Circular Economies
- E) Fair Trade Economies
- F) Doughnut Economies

For each economic framework, we include the definition, as well as a summary of key elements or principles; associated benefits; prevalence globally, nationally and locally; opportunities and considerations for application in the Central San Joaquin Valley; and policies and other levers that can support adoption.

Local Economies

Local economies maximize residents' autonomy over the present and future of their community through the creation of self-reliant, democratic economies that boost community power.

Local economies are those that transform the policies, programs and initiatives, and other aspects of the economic ecosystem to reflect the key principle that what is created in and by the community should be more for the benefit of the community than for the benefit of external actors.[1] Importantly, there is no standard definition of what geographic scale 'local' describes in this context. Some restrain the boundaries to city or county limits, others use a metropolitan statistical area (MSA), and some use

larger scales such as regional collections of counties when those communities have shared goals.[2] Promoting the prosperity of locally owned businesses is perhaps the most well-known manifestation of local economic principles.[3] However, local economies extend beyond entrepreneurship.

To be sure, the goals of local economies are not about isolation or exclusion. Rather, local economies pursue self-sufficiency, including through reduced dependence on imports, sustainable use of local resources, serving the needs of local consumers, and ensuring employment opportunities that enable workers to thrive. By supporting the development of decentralized local democratic economies rather than concentrated globalization, the movement also promotes the growth of 'interdependent local economies.'[4]

Table A.1 includes a summary of the key elements and benefits of local economies and Box A.1 summarizes key opportunities and considerations, all of which are explored in more detail in the pages that follow.

TABLE A.1

Key Elements and Benefits of Local Economies

Key Elements	Key Benefits
▪ Centering locally owned businesses	▪ Local multiplier effect
▪ Business development more than business attraction	▪ Improved socioeconomic outcomes for workers
▪ Local ownership of the supply chain	▪ Economic and job stability
▪ Economic democracy	▪ Preservation of local character and identity
	▪ Environmental benefits
	▪ Community empowerment and well-being
	▪ Support for under-resourced entrepreneurs

Source: Urban Institute analysis.

BOX A.1

Opportunities and Considerations for Adopting Local Economies

Research across contexts affirms the positive economic, social, and environmental impacts of local economies. The local multiplier effect is a well-known economic benefit, demonstrating how independent, locally-owned businesses recirculate a far greater percentage of their revenue in the local economy—up to three times more—as compared to businesses that are not locally owned or are publicly traded. The robust local economy landscape in the United States provides many examples for how a local economy could manifest in the Central San Joaquin Valley. Across the United States, local economic development supports unique, distinct cities and towns that are desirable places to live and visit.

California has several tax credits and programs that could be leveraged to develop the local economy in the Central San Joaquin Valley. Further, the Central San Joaquin Valley economy is largely built on small businesses, which are often locally and independently owned; businesses with fewer than 20 employees make up 90 percent of all businesses in the region (CVCF 2023), signaling a readiness for a locally focused economy.

However, extensive disinvestment in the region may inhibit residents' entrepreneurial pursuits. This underscores the importance of interventions like community banking, micro-loans made accessible for BIPOC and immigrant entrepreneurs, and investing in business associations that focus on supporting specific demographics and provide networking, peer learning opportunities, and funding support.

Key Elements

The local economy framework asserts that the public sector should invest in developing local businesses and supply chains in order to foster economic democracy.

Centering locally owned businesses

Business ownership, such as sole proprietorship, cooperative ownership, or other independent ownership structures can be a powerful engine for building individual and community wealth. For the purposes of this analysis, local businesses are those that are both independently owned and are headquartered in the defined geographic area of focus (city, county, or region). Local independent business ownership is also a key component of community self-determination—local entrepreneurs

use their lived experience to inform the provision of desired goods and services and build on social networks to build their businesses.[5] [6]

Local businesses are often smaller business, but that's not always the case. Medium and large businesses can also have local independent ownership and align with principles of local economies.[7] Additionally, local businesses of all sizes can, and do, provide products and services beyond their home geography. Local economies focus on how businesses and local priorities can build the kind of economy that is accountable to people and the planet.

Business development more than business attraction

Business attraction efforts are often focused on courting the favor of larger publicly traded and franchised businesses who are looking to expand their market or relocate their headquarters. Research shows that business attraction and the promise of 'new jobs' are not enough to wholly address regions' socioeconomic challenges; research on the benefits is inconclusive at best, and often shows a detrimental impact (local businesses closures and corresponding job loss due to inability to compete with the scale of the new corporation).[8] Local economy leaders focus on business development and holistic, integrated approaches to achieve markers of economic success like net new jobs, job quality and job permanence, productivity, income growth, or other qualify-of-life measures, especially.[9] The research on business development shows evidence supporting these goals.

Common local business development tools include investing in strategic initiatives such as helping existing firms and industries grow, innovate, and develop diverse talent; creating an inclusive, homegrown entrepreneurship ecosystem; rebuilding Main Streets, downtowns, or other neighborhood corridors to motivate growth and wealth creation; and centering talent development and retention as well as housing affordability in economic competitiveness and inclusion (Rodríguez-Pose and Wilkie 2017; Birch 2009). Both regional and community actors are investing in good governance by bringing local leaders and institutions together to solve problems and create the conditions in which workers, families, businesses, and other key partners are willing and able to stay and invest in the community.[10]

Local ownership of the supply chain

A supply chain is the network of materials and processes necessary to produce and distribute products and services to the consumer. A local supply chain is formed when this network is geographically close to the point of consumption at each point of the process. Note that a supply chain is not only the direct line of raw materials to production to distribution to consumption. It is instead the web of interactions between local businesses that rely on each other for goods and services; local businesses and government or institutional contractors; and local businesses and end consumers. Players in a

local supply chain (including businesses, consumers, governments, and anchor institutions) enjoy a number of benefits including reduced transportation costs, faster delivery times, improved relationships between suppliers and buyers, as well as flexibility to adapt to market fluctuations.[11] Local economies prioritize building healthy local supply chains to maximize the economic benefits of local ownership, and to avoid the uncertainty and rising inflation of the global supply chain.[12]

Economic democracy

Underpinning the local economy framework is a commitment to economic democracy, which is the belief that economic ownership and decision-making power should be shifted from corporate shareholders and managers to public stakeholders including workers, consumers, local business owners, and surrounding communities. Cooperative ownership models are a common way to achieve this aim in local businesses.[13] Additionally, some local economy leaders ensure that there are community governance structures embedded into economic decision-making to ensure they reflect the values and needs of the community.[14] At their best, local economies are grounded in the values of economic solidarity, cooperation, democracy, and sustainability, and seek to reduce inequality and increase shared wealth in the community.[15]

Benefits

Vibrant and diverse local independent business communities are correlated with higher wages, less economic inequity, community cohesion, environmental health, stronger and more resilient businesses, and stronger and more resilient economies.[16]

ECONOMIC HEALTH, COMPETITIVENESS, AND RESILIENCE

- **Local multiplier effect**. One of the strongest economic benefits of a local economy is the 'local multiplier effect.' Research continuously affirms that independent, locally-owned businesses recirculate a far greater percentage of their revenue in the local economy—up to three times more—as compared to businesses that are not locally owned or that are publicly traded.[17] When looking at the scale of a supply chain, this multiplier effect compounds. When a higher portion of money is re-spent in the local economy, more income is generated for residents, more wealth is retained locally, and more local jobs are supported,[18] all of which contribute to an increased standard of living.[19] More money circulating in the local economy also increases tax revenues that support strong local government, robust public services, and sufficient maintenance and improvements of public infrastructure and public places.

One study in Salt Lake City, Utah analyzed data from fifteen independent retailers and seven independent restaurants and compared their local economic impact with four national retail chains and three national restaurant chains. Researchers found that local retailers returned 52 percent of their revenue to the local economy while national chains returned just 14 percent. And local restaurants recirculated 79 percent of their revenue locally compared to chain restaurants' 30 percent. The strong relationship between independent businesses and recirculated revenue is directly correlated with the fact that independent businesses spend more on goods and services from other local providers than do the chains (Civic Economics 2012).

- **Improved socioeconomic outcomes for workers.** Research shows that local entrepreneurship improves a county's per capita income growth and employment growth and decreases poverty rates (Rupasingha 2013; Goetz and Fleming 2011). A study conducted by the U.S. Small Business Administration found that 2 out of every 3 jobs in the US are created by small businesses.[20] Related to the Local Multiplier Effect, the American Independent Business Alliance found that for every $100 spent at a local business, an average of $68 stays in the local economy in the form of wages paid to local employees.[21]

  A growing body of research shows that in localities where most employment is held by a handful of large companies, the concentration gives corporations enough market power to push wages below a competitive, living wage (Rinz 2018).[22] Further, in economically depressed communities, some governments try to use subsidies and tax breaks to attract large employers to address high unemployment rates (Holger, Ouimet, and Simintzi 2018).[23] [24] However, these subsidies can often create a dependence on a single employer who then has significant leverage to influence local governments to make economic decisions favorable to the employer that may be to the detriment of the community.

- **Economic and job stability**. Local economies are characterized by business landscapes that are diverse in terms of both ownership and purpose. Research shows that local and dispersed business ownership is key to economic health and resilience and strengthening the middle class (Furman and Orszag 2018).[25] [26] If a single smaller business fails, there isn't a huge shock to the system and the displaced workers are often readily reemployed with other entities. However, in communities that are built around a single large business that employs a significant portion of the population, the closure or relocation of that employer has devastating effects. Legacy cities—the post-industrial former manufacturing powerhouses of the Midwest, mid-Atlantic, and New England regions—are salient examples of the

consequences of building an economy around one business or sector. These cities (including Detroit, MI; Akron, OH; Buffalo, NY) were built around large manufacturing and assembly plants and once employed millions of immigrants and Black and White migrants from rural areas (Schilling and Velasco 2020).[27] When factories started shutting down in the mid-20th century (usually as a result of either federal suburbanization policies or because the company began outsourcing labor to less costly geographies overseas), these cities rapidly lost jobs and population. Decades later, all legacy cities have maintained a loss between 20 and 60 percent of their populations from their peak, leaving vacant neighborhoods with high unemployment and a limited tax base (Schilling, Tumber, and Velasco 2023).[28]

Local business owners don't benefit from out-migration and are invested in sticking around and working with local governments to boost workers' quality of life and the well-being of their place, as these two factors positively benefit their own profits (Tolbert 2014). This, in turn, also creates a healthier relationship between the civic community and local businesses, which can become pillars of community sustainability.[29] Further, research shows that while large corporations are likely to decrease the number of jobs in a region during economic downtowns, locally owned businesses retain more employees and also employ more people per unit of share.[30]

- **Preservation of local character and identity.** Across economic development literature, there is almost unanimous consensus that establishing and preserving a city or town's unique local identity is a key element of improving local economic health (Filion et al. 2004; Birch 2009; Ryberg-Wester and Kinahan 2013).[31] In places where large chains overrun independent businesses, the landscape becomes homogenized and indistinct, turning what was once a unique social landscape into what some scholars have termed a 'blandscape' (Duignan 2019).[32] Distinction is a core element of what makes a city or town a desirable place to live. Local identity is often the answer to 'why' someone actively chooses to live somewhere, and so promotes resident retention and attraction (Robinson 2010).[33]

CLIMATE AND ENVIRONMENTAL

- **Environmental Benefits.** A locally-focused economy often has notable environmental benefits. By their nature, local economies dramatically shrink the distance between producer and consumer, which can reduce packaging as well as pollution and greenhouse gas outputs related to refrigeration, storage, and national and international shipping (Robinson 2010). While local businesses do garner distant customers (especially with the boom of online

marketplaces), the scale at which they operate is notably less than massive shipping operations.

Further, local businesses are often housed in pre-existing buildings or offices, limiting the need for new building materials, reducing pollutants from new construction, and helping to protect open and green spaces.[34] Adaptive reuse—the practice of utilizing and revitalizing existing structures—also restores vibrancy to communities and allows for urban planning that centers around residents' needs—such as access to basic needs, housing, community connection, and green space—rather than market expansion. National and multinational companies and corporations who arrive in new cities often build new infrastructure to support their operations, and often build these campuses on the outskirts of city centers and along highways, contributing to sprawl.[35] Research shows that walkable, mixed-used neighborhoods and local business development have a beneficial relationship, and de-incentivize auto-oriented development (Meeks et al. 2014).[36]

EQUITY

- **Community Empowerment and Well-Being.** Local economies empower business-owners, investors, and workers to have more direct, long-term interest in the prosperity and health of their community.[37] [38] The success of local businesses is wrapped up in the well-being of the place-based socioeconomic network, including other local businesses, workers, consumers, and residents. Further, local economies mean that the employers making decisions are from the community, not a national headquarters that may be counties, if not states away, and so are people who feel and see the rippling impact of their decisions—and so are more considered as to their implications.

  A growing body of research also shows linkages between a thriving local economy and improvements on factors associated with community well-being, including lower rates of crime and better public health outcomes (Blanchard, Tolbert, and Mencken 2012).[39] Researchers posit that in addition to the benefits of local ownership on economic development and stability, a high degree of local ownership also develops a strong sense of 'collective efficacy,' or the capacity of residents to act for mutual benefit in a community (Blanchard, Tolbert, and Mencken 2012).[40]

- **Support for Under-Represented Entrepreneurs.** Local economies provide opportunities to support existing and aspiring business owners who are under-represented in the market, including BIPOC business owners, immigrant business owners. LGBTQ+ business owners, and

women business owners. Local business ownership that reflects the demographics community is a key way to create a sense of identity and belonging in place.[41]

Local economies that prioritize under-represented entrepreneurs develop critical infrastructure to address disparities in employment and may help narrow the racial wealth gap.[42] [43] [44] [45] For example, the average Black-owned business creates 10 jobs and the average Latino-owned business creates 8 jobs (Orozco 2021).[46] Black-owned businesses are shown to be more likely to hire Black workers.[47] Further, a study from Stanford University found that Latino-owned firms are more likely to provide 'good jobs' (those that are stable, have fair work and pay, and have a path to advancement) than White-owned businesses. Nationally, Latino-owned businesses are more likely than White-owned businesses to report that the majority of their employees are paid above minimum wage; and Latino-owned businesses are more likely to provide benefits like healthcare, retirement, flexible work, and tuition reimbursement (Orozco 2021). Faced with massive financial disparities and structural barriers to upward mobility, racially diverse business ownership is one way to expand employment access for a racially diverse workforce.[48]

Prevalence and Adoption

Local economies exist across the globe, although the degree to which these economies are nurtured and prioritized varies greatly.

GLOBAL

Each country, region, city, and community has their own unique history of local economy movements. Research shows that advocacy for local economies is growing, which is occurring alongside a boom of technological advancements in communication and transportation, deregulated trade and finance, and economic globalization, which constrain the development of local economies (McMichael 2009).[49]

Local economic advocacy, contextualized within broader movements for economic, racial, and gender justice, seeks to interrupt the extractive norms of anti-democratic corporate control and create the conditions for equitable, self-determined local economic development across the globe. Global movements towards localization do not call for isolation, nationalism, or protectionist policies. Local economy advocates often don't seek to cut global economic ties, but instead work to advance interconnected local economies and ensure that participation in the global economy is democratic and locally informed, protecting the well-being and best interests of workers and communities.

NATIONAL

Decades of advocacy in the United States have grown a strong, dispersed localist movement spanning all 50 states. Learning from the failure of past models of economic development that entwined the health of communities with the health of corporations (i.e. the fate of legacy cities in the Rust Belt), advocates are working to make the case to develop a new model of American economic success (Schilling and Velasco 2020). Currently, a significant focus of many local economic advocates in the United States is combatting the monopolistic power and outsized corporate control of multi-national and global corporations (Mitchell and Knox 2021).[50]

Importantly, the localist movement in the US works to build up local interdependence; for example, what is not available in one community can be sourced from local businesses in other regions and states, boosting the collective power of community self-reliance. This interdependence works to create a new paradigm of trade, built on trust, mutual respect, and reciprocity rather than exploitation and corporate control (Wicks 2016). Many national organizations, such as the Institute for Local Self-Reliance, Local First, New Economics Foundation, American Independent Business Association, and Community Allies, have built national networks of businesses, local leaders, and residents engaged in peer learning and advocacy. Coupled with regional and local organizations focused on building the movement in their specific communities, resources abound for those interested (Kurland, McCaffrey, and Hill 2012). Case studies from these organizations provide valuable examples for how communities can achieve local economic progress from a range of policy and programmatic levers in all kinds of geographies.

REGIONAL/LOCAL

The Central San Joaquin Valley economy as a strong focus on exports, however, businesses with fewer than 20 employees make up 90 percent of all businesses in the region (CVCF 2023), signaling a readiness for a locally-focused economy. And, businesses in the Valley CERF region are more stable compared to the state average, with consistently lower entry and exit rates of businesses (CVCF 2023).

Minority-owned businesses are a source of economic strength in the state. The California Office of the Small Business Advocate reports that minority-owned small businesses in the state contribute $192.8 billion in economic output (more than the annual GDP of 18 US States), generate $28.7 million in tax revenue, and support 2.56 million jobs (California Office of the Small Business Advocate 2023).[51] Several local and regional business service organizations focus on minority owned businesses, such as the Fresno Metro Black Chamber of Commerce, Central California Hispanic Chamber of Commerce, Madera Hispanic Chamber of Commerce, and the Southeast Asian Economic

Development Coalition; and other organizations such as regional Small Business Development Centers (SBDCs) offer more generalized support.

Opportunities and Considerations

The CERF baseline analysis of the Central San Joaquin Valley (CVCF 2023) highlights how the region may already be well-positioned to better support and develop the local economy, and indicates several areas where the principles of local economic development can contribute to improving regional outcomes.

OPPORTUNITIES

By deliberately investing in locally owned business and de-prioritizing corporate attraction, the Central San Joaquin Valley could ensure that investments are made with the end-goal of growing a competitive, resilient, high-road economy rather than short-term economic growth. Cultivating Latino-owned businesses as well as other minority entrepreneurs could have a positive impact on the region; Returning to the Stanford University study, Latino-owned firms are more likely to provide 'good jobs' (those that are stable, have fair work and pay, and have a path to advancement) than White-owned businesses (Orozco 2021). Local economic development, with deliberate investments in developing diverse business ownership, is a dynamic way to change the tides of business ownership. Business associations like the Fresno Metro Black Chamber of Commerce, Central California Hispanic Chamber of Commerce, Madera Hispanic Chamber of Commerce, and the Southeast Asian Economic Development Coalition provide essential backbone support for these entrepreneurs, and can be strengthened to provide more of the networking and peer learning opportunities beneficial to diverse local businesses, expand their assistance in lowering barriers to accessing key funding resources, and advocating for a supportive policy ecosystem.

There are also several state resources that can be incorporated into plans to develop the local economy. For example, to encourage local business ownership that produces thriving-wage jobs for workers, entrepreneurs can be connected with the California New Employment Credit, a tax credit available to eligible businesses in designated geographic areas that create net new jobs with hourly wages between 1.5 and 3.5 times the state minimum wage.[52] Eligible geographies are those with high unemployment and high poverty rates, which most of the census tracts in the Central San Joaquin Valley have.[53] The California Office of the Small Business Advocate provides a range of learning resources for starting, managing, and growing independent businesses.[54] Additionally, the Source Diverse Source Local program is a public-private project that works to build up inclusive procurement

and a California-based supply chain. The program provides training in the form of procurement readiness programs to give local business owners the knowledge necessary to obtain manufacturing, government, and corporate contracts.[55]

CONSIDERATIONS

In the Central San Joaquin Valley, White business owners are significantly overrepresented compared to the total population of the region; and Latino, woman, and Black-owned business owners are significantly underrepresented (CERF 2023). Nearly two-thirds of the Valley CERF region is designated as disinvested; disinvested areas have disproportionately higher populations of Latino people than the rest of the region; and, when compared to the state of California, Central San Joaquin Valley residents have lower household incomes and higher rates of poverty (CVCF 2023). These factors will require additional efforts and investments to support local entrepreneurship because structural inequities faced by individuals extend to current and aspiring business-owners; lack of liquid assets, solid credit, and networking connections are significant barriers to sustainable business ownerships.[56]

Measures that can help include community banking, micro-loans made accessible for BIPOC and immigrant entrepreneurs, and investing in business associations focused on specific demographics that provide networking, peer learning opportunities, technical assistance, and funding support.[57] As previously noted, several associations already exist in the region including the Fresno Metro Black Chamber of Commerce, Central California Hispanic Chamber of Commerce, Madera Hispanic Chamber of Commerce, and the Southeast Asian Economic Development Coalition, among others (CVCF 2023). As previously noted, because of the large percent of the population in the region who are Latino, focusing on building up supports for Latino-owned businesses in particular could have notable impact.

Many of the region's dominant sectors, including agriculture and manufacturing (particularly food manufacturing), have been built and scaled with a focus on exports and participation in the global economy (CVCF 2023). And, most of these businesses are smaller businesses, with fewer than 50 employees (CVCF 2023). Because these sectors are so influential in the region, if the Valley CERF coalition chooses to prioritize a local economic framework, positive decisions like channeling funding and resources towards developing independent local businesses, building and strengthening local supply chains, and disincentivizing corporate control, can all help direct the region towards a local economy and build the infrastructure to support it over the long term.

As Valley CERF looks to the future, all areas of focus in the planning process can benefit from a localist lens. Local food systems, green transportation, circular manufacturing, holistic health care, green construction, clean energy, independent retail, local arts and culture, tourism that centers

around the beauty and uniqueness of the region—all present a valuable opportunity to invest in building a network of local ownership in the Central San Joaquin Valley and thus support economic security, fulfilling jobs, and healthy communities. Given that the region is a top food producer, a food industry cluster could be a key industry of focus in local transition (see Responsible Food Systems chapter). By adopting a localist lens, Valley CERF can go beyond orienting around outputs such as market-share, continuous profit growth, and business attraction as measures of success, and instead work towards improving outcomes, such as community well-being and connection, economic stability, and stable family-supporting jobs and career pathways for workers.

Policies and Other Levers

There is a range of policy and programmatic levers that help advance a supportive local economic ecosystem, including boosting local independent businesses; and there are others that can hamper it. Some are outlined below.

ENABLING

- **Invest in local business development**. One straightforward way to encourage a healthy local economy is through directly investing in developing local independently owned businesses. These investments can look like improving access to funding opportunities and incentives for local business owners, and making intentional efforts to support under-represented entrepreneurs, such as those identifying as BIPOC, women, LGTBQ+, and immigrant.
- **Resource backbone organizations**. Backbone organizations build platforms for networking and peer learning, provide technical assistance, help entrepreneurs overcome barriers to financing, and may even engage in policy advocacy on behalf of the local business community. Resourcing these community and economic development organizations; business services organizations that focus on supporting small, local, and minority-owned businesses; and similar organizations can help build essential capacity to support systems-level shifts towards a local economy.
- **Zoning code.** A municipality's zoning code determines how land can be used and what regulations buildings are subject to.[58] These ordinances determine which areas are allowed for residential, commercial, and industrial uses; the type of businesses allowed; parking and setback requirements; building size and features (like number of exits, maximum size, Americans with Disabilities Act compliance); and more. Cities can amend zoning ordinances to support a number of broader goals, including supporting the development of local

businesses.[59] Measures like streamlined permitting and licensing, neighborhood-serving zones, and store size caps can help promote independent ownership in local economies (Alvarez, Andrews, and Lung-Amam 2021).[60] Many municipalities also likely have zoning codes on the books that are unnecessarily burdensome to local businesses, like minimum parking requirements, and may be compressing local business development.

- **Formula business restrictions.** Zoning code changes can also restrict the expansion of 'formula' businesses (like franchises) in order to support the development of more local businesses. Formula businesses are increasingly locating in downtown corridors and neighborhood business districts, pricing out local independent businesses and causing speculative rent increases that can transform business districts dramatically (Kim and Zhou 2020).[61] [62] The economic consequences of these changes are long-term: the business district often loses its distinct market appeal and loses opportunities for independent entrepreneurs. Further, businesses with a singular use (i.e. pharmacies, grocery stores) that meet the basic needs of the surrounding communities are often pushed out with rising rents and inability to compete with formula businesses' pricing, which is often below-market.[63]

  Formula business restrictions vary in intent: some aim to cap the number of formula businesses allowed in a district; some prohibit permits to formula businesses altogether; and others stipulate that certain conditions must be met before permitting is granted. For example, in 2008, the city council of Fredericksburg, Texas voted in favor of a zoning amendment that requires formula businesses to apply for a conditional use permit (which requires discretionary approval from the city) in order to set up shop in the downtown district. This amendment gives the planning commission the power to focus on approving businesses that will not 'detract from the uniqueness' of the district, will not 'contribute to the nationwide trend of standardized offerings,' and that will 'add diversity to the mix of businesses.'[64]

- **Preference in city purchasing.** Local government spending power is substantive. Because of growing awareness of the local multiplier effect and its benefits to local economies, an increasing number of cities, counties, and states are giving procurement preference to local businesses to ensure that the tax dollars funding government operations are best leveraged to support and grow local economies. Local procurement policies vary between localities. For example, some give preference to locally owned business broadly; some focus on those that meet specific characteristics (i.e. minority-owned, pay a living wage, etc.); and some apply to all city purchasing while others only apply to specific kinds of contracts and services.[65] Regardless of the structure, effective local procurement policies have clear enforcement and

reporting mechanisms as well as buy-in from the local administration. For example, Cleveland, Ohio works to ensure compliance with local procurement by processing all contracting through a separate department, the Office of Equal Opportunity.[66] The Office of Equal Opportunity is also responsible for the administration, monitoring, and enforcement of Cleveland's small business, minority, and woman-owned business programs.

CONSTRAINING

- **Public subsidies for business attraction.** Through business attraction efforts, cities and counties routinely offer massive public subsidies to court the attention of big-box stores, malls, and manufacturing and warehousing facilities for national, multi-national, and global companies.[67] Since the late 1990s, large retailers have received billions of dollars in municipal, county, and state incentives.[68] These subsidies can take the form of property tax exemptions, sales tax rebates, job tax credits, and tax increment financing—all benefits which are rarely extended to locally-owned businesses, creating an uneven playing field for competition. Local officials often cite the need for job creation and economic growth as the rationale for these corporate incentives, despite the research that consistently shows local businesses offer more and more sustainable results for these and other desirable outcomes. For example, a study in the St. Louis, Missouri metropolitan area showed that although $5.8 billion in public tax dollars was diverted to finance private development, the region experienced no increase in retail sales per capita and a minimal increase in the number of retail jobs. Further, during the period of analysis, more than 600 small businesses closed in the metropolitan area, and these job losses offset the minimal gains from new development.[69] Alternatively, in 2007, the state of Arizona adopted a law that bars municipalities in the Phoenix metropolitan region from providing any kind of tax breaks or incentives to retail development.[70] The bill was pushed forward by Local First Arizona (see Box A.2), a state-wide community and economic development organization.

BOX A.2

Example: Local First Arizona

Founded in 2003, Local First Arizona is a state-wide community and economic development organization that works to build up people-centered economies, target systems of economic inequity, and promote the socio-environmental benefits of local economies.[71] Local First Arizona uses grassroots organizing and power-building to strengthen collaboration between local leaders and lift up

the solutions identified by those most impacted by structural inequity. The organization also seeks to cultivate the unique character of Arizonan communities to create a sense of place and pride for residents.[72]

Local First Arizona's broad programming braids together consumer education, storytelling and business promotion, small business training and technical assistance, policy advocacy, micro-loans.[73] Recognizing the particular challenges faced by underrepresented entrepreneurs, they also provide tailored programming for Black-owned businesses,[74] Latino-owned businesses, and business owners in rural communities.[75]

Local First Arizona's Rural Development Council is a neutral coordinator between rural and tribal stakeholders committed to growing an inclusive economy. Programming seeks to provide local leaders the tools and access to build up an economy where rural communities and Tribal Nations in Arizona are vibrant, healthy, inclusive places to live.[76] To help reach mono-lingual Spanish-speaking entrepreneurs, Local First Arizona developed a business accelerator program called 'Fuerza Local' which provides business education while helping low-income owners build their credit in order to access fair market capital.[77]

Building up local economies requires broad actions that target all levers of the business ecosystem. Local First Arizona's decades of work have solidified the group as a backbone organization. However, while beneficial, it's not necessary to have a 'one stop shop' in order to build up a local economy infrastructure. A local coalition of organizations like Valley CERF is also well suited to collaborate and create diverse programming and advocacy, allowing for smaller organizations to coordinate and absorb different elements of Local First Arizona's model.

Triple Bottom Line Economies

The triple bottom line (TBL) economic framework guides thinking and doing by defining and measuring success along equally weighted metrics of people, planet, and prosperity.

In the triple bottom line (TBL) economic framework, people, planet, and prosperity are weighted equally because of the recognition that each are mutually reinforcing; and, when approached holistically, they support positive and sustainable social, environmental, and economic outcomes. The TBL framework is used for planning, decision-making, and accountability, and can be applied at a variety of scales—such as that of an individual business, a project, a government, or an entire economy. The principles are meant to be embedded, informing all activities, such as governance; operations; products and services; supply chains; and relationships with community, workers, and customers.

The people element of TBL recognizes that people are the heart of an economy, not just because the economy depends on the talent and labor they provide as workers, but more importantly because equitable, prosperous communities require human well-being (Hammer 2015). The planet element of TBL pertains to environmentally sound decision-making. It places value on the specific place where economic development is occurring, while also focusing on climate change and broader environmental impacts, which are globally consequential. Placemaking strengthens communities and retains workers, and stewardship of the planet ensures our economy and human life can thrive over the long-term. The prosperity element manifests on several scales, including increased profits and decreased costs for businesses, sound investments in communities, and the promotion of individual and community-scale financial well-being (Hammer 2015). Across pillars, TBL infuses an ethos of 'do the least harm and the most good' into every decision point.

Table B.1 includes a summary of the key elements and benefits of the Triple Bottom Line and Box B.1 summarizes key opportunities and considerations, all of which are explored in more detail in the pages that follow.

TABLE B.1

Key Elements and Benefits of a Triple Bottom Line Economy

Key Elements	Key Benefits
▪ Move from a growth mindset to a development mindset ▪ Adopt a 'whole systems' approach ▪ Broad stakeholder collaboration ▪ Reporting and credible certification	▪ Quality jobs and career pathways ▪ Strong 'return on investment' ▪ A suite of environmental benefits, including reduced GHG ▪ Community well-being ▪ Accountability and transparency

Source: Urban Institute analysis

BOX B.1

Opportunities and Considerations for Adopting a Triple Bottom Line Economy

The triple bottom line (TBL) economic framework is an established approach to developing the private and public sectors by equally weighting the mutually enforcing elements of people, planet, and prosperity. Research and practice assert that the framework supports socially, environmentally, and economically sustainable outcomes including community well-being, increased profits, and green operations.

The core charge of Valley CERF to create a high-road economy in the Central San Joaquin Valley is inherently aligned with TBL principles of advancing policies and practices that support the wellbeing of people and planet while advancing economic prosperity. Embracing a TBL approach would be a shift from the status quo in the region. For example, the baseline analysis of existing local and regional planning efforts in the Central San Joaquin Valley found that while there are 16 active efforts in the region focused on addressing economic challenges, only half of those plans incorporate equity considerations and only five address climate action to some degree (CVCF 2023). This lack of whole-systems coordination creates a clear opportunity for the TBL framework to be applied wholesale in the Valley CERF region, however it also implies there may be challenges to overcome.

Further, since TBL is a way to approach business practices and economic development, the principles of TBL can be embedded into all Valley CERF decisions and activities, including how it approaches developing industry clusters. There are several existing policies and incentive programs that support TBL-aligned practices in California that, coupled with CERF funding and additional investment, could help ensure TBL principles are integrated into all aspects of Valley CERF planning and implementation.

Key Elements

The TBL framework embeds the '3 P's' of people, planet, and prosperity into the DNA of public systems and private actors, aspiring to transform the economy from the inside out.

Move from a growth mindset to a development mindset

The TBL framework focuses on economic *development* instead of economic *growth*. A primary distinction is that growth speaks to economic increases—or *outputs*—while development captures economic improvements—or *outcomes*. While growth can coincide with development, a TBL approach does not prioritize growth for growth's sake. For example, a rise in GDP or corporate earnings alone (measures of economic growth) do not indicate whether that growth manifests as tangible improvements in workers' lives and in communities (measures of economic development) (Abad-Segura and Gonzalez-Zamar 2021). However, economic development plans are not inherently aligned with TBL principles; they still need to be made with a critical focus on tailoring the goals and methods of development towards social, environmental, and economic outcomes rather than focusing solely on outputs.

Adopt a 'whole systems' approach

The nature of the TBL framework necessitates that decisionmakers use a 'whole systems' approach to planning, implementation, and evaluation. A whole systems approach requires thorough analysis of investments across a project's life cycle, addressing a wide range of factors across scales and sectors that impact project success (Hammer 2015). A whole systems approach also takes into account dimensions across the '3 Ps' and centers the interdependence of these factors and the reality that they are mutually-reinforcing. Accordingly, TBL urges decision-makers to go beyond financial statements to gauge success, and instead shift to balancing financial, social, and environmental measures. Changing the definition of success, and the metrics used to measure it, changes behavior.

The TBL framework works to consider how public investments in economic development activities, and public projects generally, can be made economically, socially, and environmentally sustainable, in order to prolong the benefits of improvements and set the stage for further TBL innovation (Noguiera, Gomes, and Lopes 2022). Beyond policies, TBL within local governments can be incorporated into internal operations, capital projects and other investments, and planning efforts across departments.

Recognizing the importance of public-private interaction to achieve success, TBL economic development also focuses on creating enabling and incentivizing policy environments for a TBL culture to root and flourish in individual businesses and throughout industry clusters. Ways that the public sector can support the private sector's TBL pursuits include cost-sharing; education, training, and technical assistance; infrastructure investments; labor, environmental, health, and safety regulations, and incentives.[78] At its foundation, TBL urges every element of the system to consider how every dollar and decision can be implemented in a way that maximizes benefits for people, planet, and prosperity and reduces harms, especially for marginalized and vulnerable populations.

The TBL framework can also be applied to developing and transforming existing industries, such as food (inclusive of agriculture), manufacturing, and shipping and logistics. For example, without a TBL approach, the practices of these and other industries often result in corresponding environmental degradation such as air, water, and soil pollution; environmental health concerns for workers, such as toxic exposures and climate vulnerability; and other negative environmental, health, and economic outcomes for workers, communities, and planet (Usman and Balsalobre-Lorente 2022). By approaching the future of all industries through a TBL lens, decisionmakers can identify the key improvements that must be made for success across the '3 Ps', inclusive of the success of existing companies (Usman and Balsalobre-Lorente 2022).

Broad stakeholder collaboration

A TBL framework calls for intentional engagement across stakeholder groups (community members, local government agencies, financial investors, workers, business owners, etc.). In the context of a project, for example, this engagement becomes a key source of data and information for project planning and decision-making. Engagement strategies place particular weight on community engagement to ensure that projects reflect the needs of residents and workers—two stakeholder groups often not given voice in economic decision-making—and that they are implemented in a way that improves community well-being and environmental health, while preventing potential displacement. Displacement from gentrification results when economic and community development activities occur without community leadership and without anti-displacement policy measures.[79] By

embedding community voice into a project's DNA, TBL helps ensure that projects improve, rather than disrupt, residents' lives.[80]

Reporting and credible certification

Transparent accountability through reporting or certification is a key feature in TBL practices and essential components of its success. Without transparent accountability, activities from corporations and government agencies that purport to address serious social, economic, and environmental concerns will often be met with skepticism from communities, researchers, and activists who are familiar with the empty promises of corporate social responsibility campaigns and planning efforts that lack enforceability (Usman and Balsalobre-Lorente 2022). TBL works to ameliorate these concerns and build trust through both internal and external accountability and transparency.

Internally, continuous learning that focuses on evaluation is an important way for entities to determine how well impact is aligning with intent. This is also an opportunity to determine what corrective actions may be needed to better align impact with intent. Externally, measures like local government using regulations and enforcement measures, like emission caps, support accountability.[81] Project or business-level participation in third-party certification programs, such as Leadership in Energy and Environmental Design (LEED),[82] Sustainable SITES,[83] Sustainability Accounting Standards Board (SASB),[84] benefit corporation (B Corp) certification,[85] Global Reporting Initiative (GRI),[86] and Global Impact Investment Rating System (GIIRS),[87] also help TBL efforts gain quantifiable credibility. These and other tools are needed to help leaders assess TBL performance and ensure that project implementation aligns with project design. Further, these certifications provide useful standards and guideposts for decision-makers to coalesce around in their businesses, projects, industries, and economies. Accountability measures need not be punitive, but there may be a need to structure some in ways that ensure tangible consequences if minimum standards are not met.

Benefits

A broad evidence base shows that TBL outcomes produces proven, tangible, interconnected benefits by intrinsically linking together the success of just employment, strong return on investment, environmental sustainability, and community well-being. Other economic frameworks—including local, cooperative, and circular—can support TBL goals; if these frameworks are used to help advance at TBL economy, the benefits of each can be expected as well.

ECONOMIC HEALTH, COMPETITIVENESS, AND RESILIENCE

- **Quality jobs and career pathways.** TBL is focused on human well-being, and therefore places particular importance on labor and worker rights, promoting quality jobs through measures like living or thriving wages as well as health insurance, personal and sick days, and retirement contributions.[88] Well-paying jobs that enable workers to have the resources to thrive contribute to economic success by stimulating the economy, increasing tax revenue, and broadly enabling improvements in other indicators of community well-being like public health and housing stability.[89] Communities that make quality jobs (those that fairly compensate labor, provide opportunities for advancement, provide comprehensive benefits, healthy working environments, etc.) accessible to all, in turn promote upward mobility and minimize unnecessary financial and social burdens for individuals, families, and local governments (Montenegro 2021). Focusing on the long-term success of employers also encourages investments in pathways to employment and career advancement. Individual entities may work to achieve this through measures like training, placement partnerships, and continuing education incentives. Economic development plans often approach these goals by funding the development of tailored continuing education and training programs with trusted organizations.

- **Strong 'return on investment.'** Although the goal of TBL is not to maximize profits, and instead to balance the 3 P's, research shows that TBL principles are key contributors to project efficiency, performance, and profitability as many environmental and social measures produce quantifiable economic benefits (Haller et al. 2022). Applied to public investments, using a TBL framework can produce tangible benefits for residents, whose tax dollars funded the project. For a general example: to support the rehabilitation of a recreation center and its grounds in a low-income community, the community members were proactively engaged in how they wanted to use the space, which was honored in the planning and design; and it was retrofitted to "green building" and sustainable landscape standards using local suppliers and contractors who employed local residents. Research also affirms that TBL practices improve long-term business outcomes, including profit increases, cost reductions, risk aversion, and talent retention. In fact, research shows that businesses that strongly adhere to TBL practices can drive down business costs by up to 10 percent and experience up to 20 percent higher growth and valuation.[90] A report by McKinsey found that environmentally-focused business initiatives can improve operating profits by up to 60 percent by reducing unnecessary resource use and waste.[91] And by focusing on conditions that support employee retention, businesses not only benefit from more stability in productivity due to lower disruptions from

staffing turnover, but are then also able to redirect time and money that would otherwise be used to search for, hire, and train employees towards operations, innovation, and business development.[92]

CLIMATE AND ENVIRONMENTAL

- **Environmental benefits and green operations.** Inherent to the TBL is a focus on minimizing negative and maximizing positive environmental outcomes, although depending on the initiative's specific geography and footprint, the type and degree of environmental benefits will vary. TBL projects are always cognizant of environmental impacts, and make conscious decisions to mitigate environmental harms and maximize environmental good. For projects like public infrastructure or public and private operations, climate and environmentally responsible practices may include green building construction, energy and water efficiency, renewable energy use, and investing in car-alternative modes of transportation (Hammer et al. 2015). Projects that interact with environmentally fraught geographies may incorporate natural resource restoration elements like brownfield remediation or wildlife habitat restoration and design and implement with climate resilience in mind (Hammer et al. 2015).

  Across TBL projects, reducing GHG emissions and air pollution, water pollution, and soil pollutants are key considerations—as are actively improving air, water, and soil quality. Public GHG reduction efforts (like net zero) can help guide private sector participation in GHG reduction, and policies like emissions caps also support this. For example, for companies and projects that rely on the transportation of goods, they may reduce emissions by investing in building up the local economy and focusing local or regional distribution; or for a project that impacts with an environmental justice community, intentional efforts to improve environmental and public health through land use measures like buffer zones might be included. Across these and other environmental benefits, private actions are often strengthened by a robust public infrastructure that leverages regulations and enforcement when needed and offers financial rewards for aligning with climate action (Hammer et al. 2015). In addition to being beneficial for people and planet, environmental initiatives also create short, medium, and long-term direct and indirect economic benefits (Ranjbari et al. 2021; Ye Fan et al. 2023).

EQUITY

- **Community well-being.** TBL's focus on people extends beyond individual improvements in workers' lives to encompass the well-being of whole communities. Many TBL economic development projects seek to enhance public spaces and cultural sites with and for the

communities they are in. By investing in placemaking (which relies on resident leadership to shape the built environment into what they want and need to live, work, and thrive), TBL encourages resident retention, increases property values (alongside anti-displacement measures), and fortifies residents' sense of belonging in community (Hammer et al. 2015). TBL efforts may also focus on small business development or quality job creation and retention in ways that support and empower residents in less-resourced communities and for residents who face structural barriers to employment (Hammer et al. 2015). Many community benefits are also created by environmental benefits. For example, when faced with a problem like localized flooding or stormwater runoff, TBL decision-making might consider investing in nature-based water infrastructure, which could address the community safety and public health concern in a way that is environmentally responsible and climate resilient, improves public safety, and creates local jobs (SBN 2021). Further, TBL embeds community engagement as a component of planning, implementation, evaluation, and other aspects of decision-making. Community engagement through TBL aims for community empowerment and ownership. Importantly, stakeholder and community engagement are not just a component of public TBL economic development, but are also incorporated into private sector decision-making.

Prevalence and Adoption

Since the advent of TBL terminology in the 1990s, the TBL framework has been adopted across corporate and government entities, building on decades of holistic and systems thinking. However, it is important to note that TBL has also been popularly (and inaccurately) conflated with other frameworks like corporate social responsibility (CSR) and environmental, social, and corporate governance (ESG).

GLOBAL

The United Nations leads coordinated global strategy and action towards corporate sustainability and ethical business practices that protect human rights and environmental health. The United Nations Global Compact (UNGC) works with the private sector to scale the UN Sustainable Development Goals (SDGs) to actions that can be taken by businesses (UNGC 2015). By working to align businesses with the principles of human rights, labor rights, environmental protection, and anti-corruption, UNGC strives to enable ethical markets globally.[93] Many companies in the Global North have outsourced harmful elements of their supply chains to nations in the Global South in order to cut labor and production costs through concealed, distant forced labor, child labor, and hazardous working

conditions (Birkel and Muller 2021). Members of the UNGC cite supply chain sustainability as the biggest challenge to improving their businesses, necessitating particular focus.[94] UNGC provides action-oriented tools and guidance for each of the 17 SDGs, which include eradicating poverty and hunger, reducing inequalities, health and well-being, climate action and environmental health, infrastructure resilience, and sustainable consumption and production.[95] Another UN organization, ICLEI-Local Governments for Sustainability, focuses on providing technical assistance to the public sector to support TBL target-setting, monitoring, and reporting.[96]

In Europe, the European Union's Corporate Sustainability Reporting Directive requires that all large companies publicly disclose their social and environmental impact.[97] There are approximately 1,100 disclosures that must be reported on, and the directive requires reporting to stakeholders more than just shareholders and other financial investors.[98]

Business leaders across the globe are increasingly turning towards implicit (and explicit) TBL policies given the growing body of evidence that TBL practices are good business: they increase long-term profits, lower costs, reduce risks, help to attract and retain talent, and garner consumers' good favor (Hammer 2015). The rise in certified B Corps (globally there are now over 7,300 certified businesses, including national and multi-national brands) is one indicator of TBL adoption in the private sector. B Lab, the international standard-setting and certifying body for B Corps, is a well-known standard-setter for TBL in the private sector given the rigorous assessment and verification process prospective members must undergo.[99] The Global Reporting Initiative (GRI), established in 1997, is perhaps the most widely used sustainability reporting framework. GRI seeks to set international standards for TBL reporting that can be scaled to organizations of any size, sector, and geography.[100]

NATIONAL

Recent federal moves including the Infrastructure Investment and Jobs Act,[101] Inflation Reduction Act, and White House Executive Orders (including EO 13985 'Further Advancing Racial Equity and Support for Underserved Communities Through the Federal Government,'[102] EO 14057 'Executive Order on Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability,'[103] and EO 14030 'Executive Order on Climate-Related Financial Risk,'[104] among others) indicate increased acknowledgement by the federal government of the interdependence of economic health, equity, and climate action, and their willingness to create policy conditions that encourage TBL-aligned practices.

In US economic development, prevalence of the explicit terminology of 'TBL' peaked in 2012-2015 following the release of the Economic Development Administration's (EDA) Triple Bottom Line tool.[105] The tool, which is now defunct due to lack of federal funding, was designed to assess

initiatives' adherence with TBL goals.[106] The tool helped economic development decisionmakers quantify and communicate the benefits of their investments, identify project assets and gaps, and compare potential projects to determine which delivered the best return on investment and community priorities. A report featuring 18 case studies of TBL in-action across the country and across economic development foci accompanied the tool's release.

Though the EDA's TBL tool is no longer active, states like Maryland have developed their own assessment frameworks and there is growing consensus on how to best monitor and inform TBL economic development efforts.[107] Developing local and regional sustainability assessment frameworks is important to help policymakers determine the causal relationship between public investments, policies, and furthered social and environmental benefit. Further, new tools like the Full Frame Initiative's Wellbeing Insights, Assets, and Tradeoffs tool help the public sector evaluate the impact of major infrastructure projects with an evaluation framework consistent with TBL.[108]

More recently at the federal level, and in response to increasing financial risks resulting from climate change, the US Securities and Exchange Commission (SEC) embarked on developing climate risk disclosure regulations for publicly traded businesses.[109] However, in response, conservative policymakers across 37 states introduced more than 156 'anti-ESG' bills in the first six months of 2023, which seek to broadly prohibit investment managers from considering ESG factors in risk analysis.[110]

REGIONAL/LOCAL

California is an established 'incubator' for state-level laws and policies targeted at mitigating climate change. In the absence of sustained national climate action, California legislators have responded with relatively strong and comprehensive environmental regulations.[111] Business non-adherence with these regulations can have financial consequences. Given the trend towards increasingly strict regulation as the impacts of climate change worsen, many business consultants in the state recommend that businesses take a proactive, rather than reactive, stance towards integrating sustainable business practices.[112]

Recently passed California bills SB253 (Climate Corporate Data Accountability Act) and SB261 (Climate-Related Financial Risk Act) require climate risk financial disclosures for businesses operating in the state. SB253 requires both public and private businesses with revenues greater than $1 billion to comprehensively report emissions and SB261 requires corporations with annual revenues over $500 million to disclose climate-related financial risks and corresponding mitigation strategies to the public.[113] [114]

California's broad protections regarding worker discrimination, wages, benefits, and more make it one of the most 'worker-friendly' policy environments in the United States. California's minimum wage is $15.50 per hour (scheduled to increase to $16.00 per hour in January 2024), though some cities have adopted higher minimums (with the highest being $18.07 per hour in San Francisco). Its notable that California's state minimum wage is double the federal minimum wage of $7.25, it's still not enough to cover costs of living in parts of the state, including in the Valley CERF region where the 2-bedroom housing wage is about $21 per hour (CVCF 2023). Other recent legislation aligned with TBL business practices include SB-1162 (New Pay Transparency Act),[115] AB-701 (Warehouse Quotas),[116] and AB-1066 (Overtime for Agricultural Workers),[117] which encourage better working conditions and employment opportunities.

BOX B.2

Example: Clean Energy Works of Oregon (CEWO)

Investing in clean energy can be a powerful way to promote TBL economic development. Investments in renewable energy and energy efficiency support local-scale climate action, and can provide economic opportunities for local businesses, create quality jobs, and provide affordable reliable energy for residents and businesses, among other benefits (see the Clean Energy chapter of this report).

Clean Energy Works of Oregon (CEWO) expands clean energy adoption by addressing barriers to adoption by households and businesses as well as barriers to employment in the industry.[118] CEWO is currently focusing on advancing inclusive utility investment programs: the utility covers upfront costs for individual clean energy and energy efficiency upgrades and recovers its costs through a fixed charge for cost recovery on the customer's utility bill.[119] They do this through consumer-level energy management upgrades, on-site solar installation, energy storage, and electrifying the building and transportation sectors. CEWO devotes significant attention to systems-level action as well, helping utilities create business plans that allow greater access to clean energy (especially for low-income communities and communities of color who face significant barriers to participation in the clean energy transition) and providing policy and regulatory support.

To develop the sector's workforce, CEWO promotes the creation and retention of 'high road' jobs through training programs, scholarship and continuing education opportunities, hiring assistance, business systems management, and consulting on culturally competent workplaces. CEWO also focuses on creating greater industry access for historically underrepresented workers and business-owners including people of color, women, veterans, and disabled individuals. These sector investments also have notable environmental benefits including GHG emission reductions, pollution mitigation, and energy efficiency.[120]

Opportunities and Considerations

The core charge of Valley CERF of creating a high-road economy in the Central San Joaquin Valley is inherently aligned with TBL principles, since the advancement of policies and practices that support the wellbeing of people and planet while advancing economic prosperity are essential to CERF's mission. Further, since TBL is a way to approach business practices and economic development, the principles of TBL can be embedded into all Valley CERF decisions and activities, including how it approaches developing industry clusters. There are several existing policies and incentive programs that support TBL-aligned practices in California that, coupled with CERF funding and additional investment, could help ensure TBL principles are integrated into all aspects of Valley CERF planning and implementation.

OPPORTUNITIES

TBL itself demands a wholesale approach, so the opportunities to advance TBL in the Valley CERF region are broad, and include continued shifts in government operations, initiatives, investments, and policies; as well as continued shifts in the private sector—from the industry scale to the business sale—supported by government efforts. As this menu of opportunities is extensive, and supported by opportunities outlined in other chapters of this report, we aim to offer a high level snapshot of a few possibilities.

Within the larger context of California's supportive policy environment, the TBL framework could help coordinate strategic investments and planning to drive a high-road economic transition in the Central San Joaquin Valley. Building off the plan synthesis in the Valley CERF baseline analysis (CERF 2023), there is also a need and opportunity to align economic development and climate action plans, and to embed equity within those efforts. The cross-sector, cross-county coalition of Valley CERF contains many of the stakeholders needed to carry out that process, and may be a good first step to ensure investments are made with alignments across people, planet, and prosperity.

To spur corporate action, the state has several financial incentives for TBL-aligned actions, which Valley CERF could benefit from. For example, the California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA) works with public and private partners to provide financing for industries focused on increasing the development of renewable energy, energy efficiency, advanced technologies to reduce air pollution, energy conservation, and job creation.[121] The California Food Production Investment Program (FPIP), managed by the California Energy Commission, offers grants to the state's food and beverage companies to reduce greenhouse gas emissions.[122] And the Employment Training Panel (ETP) provides funding to employers to assist in upgrading the skills of their workers through training that leads to good paying, long-term jobs.[123]

Valley CERF can also prioritize efforts around public policies that 'raise the floor' for business operations to align minimum standards with TBL ideals. For example, emissions caps and net zero programming, mandatory green building and operations standards, legislation to further raise the minimum wage to a thriving wage, and more pro-worker legislation can be helpful in catalyzing private sector action.

In order to facilitate TBL's evolution towards becoming the norm, Valley CERF can strive to embed these principles not only in industry clusters that are inherently better positioned for TBL, but to also incentivize TBL behavior in industries that are currently non-adherent. With the exception of industries that are inherently at-odds with TBL principles (i.e. oil and gas extraction), it will be important to meaningfully assess opportunities for transformation across scales (industries, sub-industries, specific businesses) and the specific policies needed to achieve this. Additionally, storytelling can be a powerful asset for economic transformation. By investing in and lifting up the stories and best practices of businesses who are already making changes towards aligning with the triple bottom line, other business owners and decisionmakers can gain visibility into what is possible, and what is happening, in the region.

CONSIDERATIONS

It's essential to note that shifting economic investments to promote TBL does mean that certain industries may experience job losses, though research shows these loses are covered and exceeded by job growth. For example, McKinsey estimates that shifting the global agricultural sector towards net-zero emissions could result in 34 million jobs lost (largely due to reduced farming of cows and other grazers for meat) and 61 million jobs gained (largely related to energy crops and poultry production) globally by 2050 (Krishnan et al. 2022). This also underscores the importance of a just transition; as industries shift towards TBL alignment, it's essential that workers be supported to develop the skills they need to maintain family supporting jobs in the low-to-no-carbon economy. Funding can be used to subsidize training, retain workers in transitioning businesses, and provide direct pipelines to new employment.[124] During transition, it's also important to aid displaced workers through measures like income-support (unemployment protection, direct cash transfers, etc.) which provide support while workers find new jobs (IMF 2022).

Policies and Other Levers

TBL itself demands a wholesale approach, so it's recommended to focus on developing a holistic policy and practice ecosystem that braids together conditions that support positive outcomes for people,

planet, and prosperity. The wholesale systems change that TBL encourages can be overwhelming for some, which could make it difficult to identify 'first steps.' As the menu of potential policies and programs is extensive, we offer a narrow list exemplifying enabling levers that have direct impacts on economic development and business practices.

ENABLING

- **Creating local TBL plans**. To successfully implement TBL-aligned actions, they must first be planned for. All local governments take part in planning processes, including Comprehensive Plans, Economic Development Plans, Climate Action Plans, Transportation Plans, and Equity Action Plans; these plans are a way to explicitly chart a path forward for social equity and climate action alongside community and economic development. Specifically, local governments can make efforts to align plans and priorities across sectors to ensure that actions are mutually beneficial (i.e., align climate plans and economic development plans so that economic planning efforts don't put forward actions that threaten climate goals).
- **Prioritize TBL in procurement.** Local government agencies can adopt guidance that incorporates 'non-financial' elements that capture environmental impacts (i.e., energy efficiency, GHG emissions, use of renewable energy, recycled content) and social equity (i.e., public health impacts, environmental justice, fair labor practices, thriving wages) into procurement decisions.[125] Procurement policies that mandate the lowest-bid contracts be accepted often perpetuate undesirable business practices. However, contracting by "best value," which may include incorporating TBL measurements (such as those used by B Lab) into contract assessments can help agencies use public funds in ways that positively impact the community.[126] This lever, which encourages a race to the top instead of to the bottom, can also apply to individual businesses making supply chain and other contracting decisions.[127]
- **Invest in TBL-ready industries.** To gain momentum, it's advantageous to first invest in industry clusters that are already primed to incorporate TBL principles including clean energy, responsible food systems, one water, and circular manufacturing. Prioritizing sectors that are already structured to support TBL policies and practices helps produce case studies and localized best practices that can then be used to develop plans to innovate in other industries.
- **Providing financial and other incentives.** "Raising the floor," such as by mandating new minimums for socially and environmental responsible standards in business practices can drive behavior change in all corners of the private sector. Financial incentives can also help drive behavior change, rewarding desired behavior, such as with as tax credits and grants, or deterring undesired behavior, such as with fees or fines.

- **Resource backbone organizations.** Building a community of practice around the kind of systems change TBL promotes is a key part of broadening the number of businesses and public agencies that adopt TBL into their operations and to what degree. Related, organizations that provide technical assistance to support adoption are a critical ally in expanding TBL implementation. Certification is important as it both builds accountability and provides concrete guidance to shift towards TBL. Peer networks are important avenues for sharing best practices and lessons learned. Local governments and funders seeking to promote TBL can offer subsidies to cover the costs of certification by organizations like B Lab[128] as well as invest in backbone organizations that provide a supportive and educational peer community, advocacy, as well as other supports for businesses seeking to expand their TBL practice.

CONSTRAINING

- **Ideological backlash.** The rise of 'anti-woke' or 'anti-ESG' discourse and legislation, pushed forward by conservative activists and organizations, is one component of movements to shift US culture and institutions towards more conservative norms.[129] Rather than addressing the socio-environmental and economic benefits of TBL decision-making, these movements instead focus on values-based opposition to topics like climate action, racial justice, worker rights, and DEI policies.[130] Given the fact that 37 states introduced over 156 'anti-ESG' bills in the first six months of 2023, this movement has material implications for the growth of TBL.[131]
- **Attachment to 'business as usual'**. While TBL-thinking is growing, its undeniable that financial 'bottom line' economic decision-making remains dominant in the United States. Deeply entrenched economic mechanisms are difficult to overcome and will make it necessary for state and local governments, as well as financial institutions, to shift policy environments so that businesses and agencies can align their framework of success with the TBL.

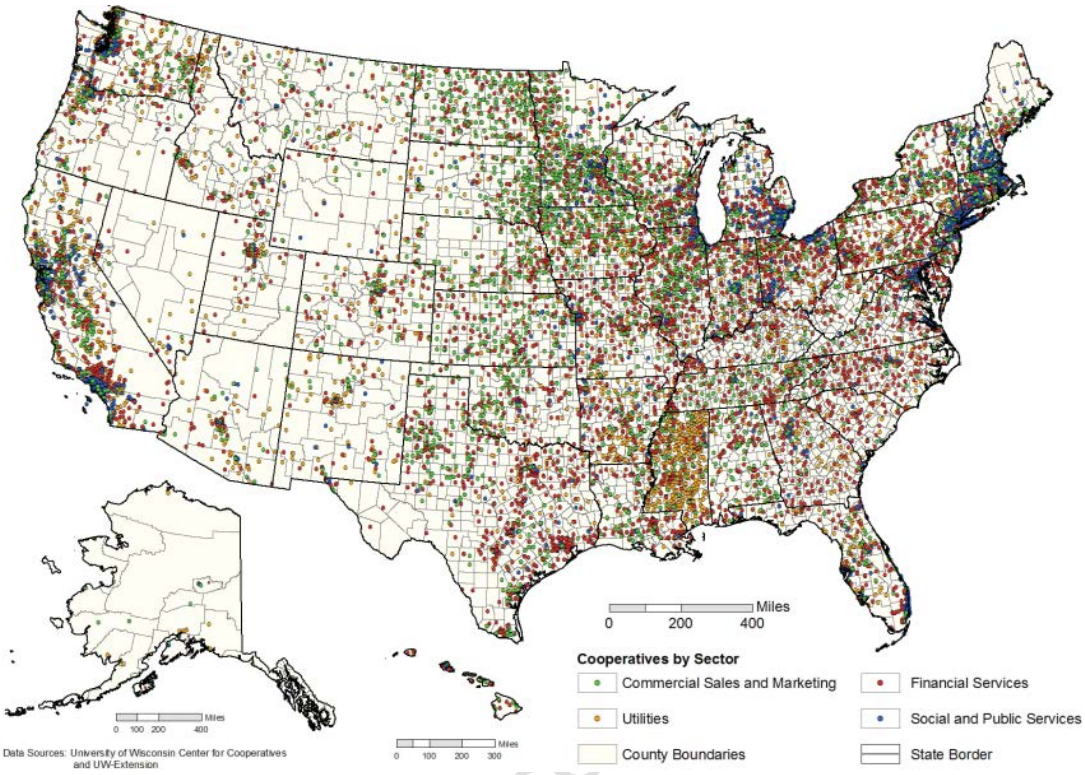
Cooperative Economies

Sometimes also referred to as a solidarity economy, cooperative economies are based on mutuality and cooperation instead of self-interest and competition. Cooperatively owned businesses, which are people-centered enterprises jointly owned and democratically controlled by and for their members, are a common manifestation.

Solidarity Economy initiatives generally share a broad set of values, including building communities of cooperation, fostering relationships of mutual support, moving towards shared responsibility and democratic decision-making, and strengthening the diversity of local cultures and environments (Miller 2010). Many interpretations of the Solidarity Economy also reject the notion that maximizing growth should be the primary goal of the economic system—for instance, the New Economy Coalition understands the Solidarity Economy to be "a global movement to build a just and sustainable economy where we prioritize people and the planet over endless profit and growth."[132] We focus on cooperatives in this fact sheet as one of the more tangible aspects of the Solidarity Economy.

The International Cooperative Alliance defines cooperatively-owned businesses as "people-centered enterprises jointly owned and democratically controlled by and for their members to realise their common economic, social, and cultural needs and aspirations."[133] Cooperatively-owned businesses, often known as cooperatives or co-ops, can be organized in many different ways, but common models include consumer co-ops, which are owned by members who collectively purchase goods or services; producer co-ops, which are owned by members who produce similar goods or services and collectively negotiate prices or access to markets; and worker co-ops, which are owned by workers who control the direction and operation of the business.[134] Housing cooperatives are another type of cooperative in which each member of the cooperative owns a share, which entitles the member to occupy a unit of housing.[135] Regardless of the specific type, cooperatives operate in nearly every industry. Consumer cooperatives, for example, can include credit unions, grocery stores, sporting goods stores, and more. Figure C.1 maps the cooperatives operating in four aggregate sectors across the US as of 2009.

FIGURE C.1
Distribution of US cooperatives by sector



Source: University of Wisconsin Center for Cooperatives 2009
Notes: The commercial sales and marketing sector includes cooperatively owned businesses operating in farm supply, marketing, biofuels, grocery and consumer goods retail, arts and crafts, and entertainment. The social and public services sector includes cooperatively owned businesses operating in housing, healthcare, daycare, transportation, and education. Data for housing cooperatives are not included in the estimate. The financial services sector includes cooperatively owned businesses operating as credit unions, in farm credit, and in mutual insurance. The utilities sector includes cooperatively owned businesses providing electric, telephone, water, or waste services.

Table C.1 includes a summary of the key elements and benefits of cooperative economies and Box C.1 summarizes key opportunities and considerations, all of which are explored in more detail in the pages that follow.

TABLE C.1

Key Elements and Benefits of Cooperative Economies

Key Elements	Key Benefits
▪ Voluntary and open membership	▪ Jobs and job security
▪ Democratic member control	▪ Business performance
▪ Member economic participation	▪ Local economic prosperity
▪ Autonomy and independence	▪ Environmental sustainability
▪ Education, training, and information	▪ Improved racial and gender equity
▪ Cooperation among cooperatives	▪ Community development
▪ Concern for community	▪ Worker empowerment and well-being

Source: Urban Institute analysis

BOX C.1

Advancing a Cooperative Economy in the Central San Joaquin Valley

Cooperatively owned businesses have existed in the US for more than two centuries,[136] and evidence suggests that they can support all three CERF goals of economic health, climate action, and equity by fostering solidarity, mutuality, and concern for community. Both nationally and internationally, there is strong evidence that cooperatives can contribute to local economic prosperity, create jobs, advance environmental sustainability, and reduce inequality.

While the cooperative model is by no means new, there are indications that it has been gaining traction in recent years. The United Nations named 2012 the "year of the cooperative"[137] and, while it is difficult to estimate the number of cooperatives in California, worker cooperatives in particular have been gaining support from the California legislature—most recently, in January 2023, the state passed the California Employee Ownership Act, which will create an Employee Ownership Hub to help established businesses transition to employee ownership.

While policy and funding can continue to support the creation and growth of cooperatives, fostering supportive networks and enabling narrative and culture change are equally important to growing the cooperative movement in the Central San Joaquin Valley. Food and energy cooperatives may be particularly promising opportunities for the Valley CERF coalition to pursue given the region's economy and the existence of state programs that the coalition can leverage to target investments.

Key Elements

The International Cooperative Alliance, a leading global network of cooperatives, adopted seven core principles in 1995, and many cooperatives around the world operate according to these principles.[138]

Voluntary and Open Membership

Cooperatives are open to any person willing to accept the responsibilities of membership. They do not discriminate on the basis of race, gender, religion, or any other factor.

Democratic Member Control

Cooperatives are democratically controlled; every member has equal voting rights and plays a role in making decisions about the organization, which could include electing members to represent them.

Member Economic Participation

Cooperative members contribute equitably to the capital of their cooperative and maintain democratic control over the collected capital. This means that, instead of exploiting working people in the name of maximizing capital, capital is put to work in service of working people. Cooperatives do this in many ways, including by equitably distributing any surpluses produced, increasing members' bargaining power, providing credit to members under favorable terms, and democratizing the processes of production, distribution, and consumption.[139]

Autonomy and Independence

Cooperatives are autonomous organizations controlled by their members. If a cooperative enters into agreements with other organizations, they must do so based on terms that preserve members' democratic control and the cooperative's autonomy.

Education, Training, and Information

Cooperatives provide education and training for members, managers, employees, and elected representatives, so that everyone can contribute effectively to the co-op's development. They also educate the public about the nature and benefits of cooperation.

Cooperation Among Cooperatives

Individual cooperatives help strengthen the cooperative movement by working together with other cooperatives, whether locally, regionally, nationally, or even internationally.

Concern for Community

Cooperatives work towards the sustainable development of their communities, which includes economic, social, and environmental sustainability, from local to global levels. As collective institutions which exist to assist individuals in communities to help themselves, cooperatives have a responsibility to be socially and environmentally responsible in all their activities (ICA 2021).

Benefits

Evidence shows proof and promise that cooperatives contribute to positive economic, climate and environmental, and equity outcomes, all of which are in alignment with CERF goals. Some of the benefits of cooperatives are outlined below.

ECONOMIC HEALTH, COMPETITIVENESS, AND RESILIENCE

- **Jobs and job security**. Cooperatives currently provide jobs or work opportunities for 280 million people globally, more than 10 percent of the world's employed population.[140] This includes both employment at cooperatively owned businesses, as well as employment at businesses that organize their production together with other cooperatively aligned businesses (Roelants et al. 2014). Further, evidence suggests that employee-owned businesses perform fewer layoffs and experience greater employee retention, even through economic volatility. For example, one study found that, in 2010, during the Great Recession, 12.3 percent of workers at non-worker-owned companies were laid off, compared to only 2.6 percent of employees at worker-owned businesses (Kruse and Kurtulus 2017).
- **Business performance.** Research has found that worker ownership strengthens business performance. For example, an annual survey of worker cooperatives found that across all industries, cooperatives had an average profit margin that was almost 8.5 percent higher than the average private firm (DAWI 2014). When it comes to agricultural cooperatives, the US Department of Agriculture finds that cooperatives help increase farm income in five different ways, including through premium pricing for products, reducing handling or processing costs through economies of scale, and developing new markets for products (USDA 1990).
- **Local economic prosperity.** As "community-based business anchors," cooperatives can contribute to the prosperity of local economies by creating jobs that allow employees to earn fair wages and accumulate assets; providing affordable goods and services; and developing human and social capital within the community.[141] Cooperatives can also serve as local and regional anchors by investing profits back into the community and procuring locally (Theodos

et al. 2018). Additionally, research has found that for every dollar spent at a food cooperative, an average of $1.60 is generated for the local economy, suggesting that cooperatives also contribute to local multiplier effects that further strengthen local economies.[142]

CLIMATE AND ENVIRONMENTAL

- **Environmental sustainability.** A core principle of cooperatives is concern for community, which encompasses social, economic, and environmental sustainability. Cooperatives across the world have played key roles in advancing environmental sustainability, including by developing eco-friendly products, practicing and promoting green and ethical consumption, advocating for better environmental regulations (ICA 2021), and developing strong ethical and local supply chains. From 2005 to 2021, for instance, electric cooperatives in the US successfully reduced their greenhouse gas emissions, achieving reductions in carbon dioxide emissions of 17 percent and reductions in sulphur dioxide and nitrogen oxide emissions of 82 and 68 percent.[143]

EQUITY

- **Improved racial and gender equity**. The International Labour Organization notes that the cooperative model "is often viewed to be more sustainable and resilient in times of crises…and is seen as well-suited to advance gender equality and women's empowerment," amongst other dimensions of equity (ILO 2018). Other evidence suggests that employee ownership can help narrow race and gender wealth gaps (Boguslaw and Schur 2019), in part by broadening the distribution of income and wealth (Kruse and Kurtulus 2017).
- **Community development**. Many studies have linked cooperatives to positive community development outcomes, such as the provision of social services to workers and their families (Bendick and Egan 1995). Some cooperatives have also created community boards that empower residents to have a voice in the relationship between the business and its community.
- **Worker empowerment and well-being**. Cooperatives can also contribute to the empowerment and well-being of workers. Cooperative models empower workers to make decisions about their workplaces; research has found that empowering workers in this way has positive impacts on worker health and well-being, both physical and mental (Marin-Garcia and Bonavia 2021; Cox and Clomax 2019). Worker-owned companies also provide stable employment and more flexible schedules that contribute to higher quality of life standards for workers (Boguslaw and Schur 2019).

Prevalence and Adoption

Cooperatively owned businesses can be found across the world, including throughout the US and California, and in most sectors of the economy.

GLOBAL

The International Cooperative Alliance estimates that there are more than 3 million cooperative enterprises in the world, with over one in ten people worldwide belonging to at least one cooperative.[144] As previously noted, cooperatives also provide jobs or work opportunities for 280 million people globally, more than 10 percent of the world's employed population.[145] In 2014, cooperatives generated nearly $3 trillion in revenue globally, more than the Gross Domestic Product of France, the fifth largest economy in the world.[146]

NATIONAL

The University of Wisconsin Center for Cooperatives estimates that there are approximately 30,000 cooperatives in the US, and that together they own more than $3 trillion in assets, generate over $650 billion in revenue, provide more than $74 billion in wages and benefits, and support more than 2 million jobs (WISC 2009). There are many different types of cooperatives across the nation, from consumer cooperatives to worker and producer cooperatives, and they operate in many different industries. Estimates suggest that more than 130 million people in the US are members of at least one cooperative.[147]

Over 90 percent of US cooperatives identify as consumer cooperatives, which includes organizations such as credit unions, rural utilities, and even large retailers like the outdoor equipment store REI Co-op.[148] However, worker cooperatives have gained traction in recent years, partly in response to what is known as the "silver tsunami"—the mass retirement of baby boomers, many of whom have no succession plans for their businesses.[149] Proponents see this as an opportunity to convert these businesses to worker-ownership to not only help preserve the business and the jobs, but also help build wealth for the workers.[150] From 2016 to 2019, worker co-ops were the most common type of new co-op, representing 47 percent of all new cooperatives formed during that period.[151] The US Federation of Worker Cooperatives, a national membership organization for worker cooperatives and democratic workplaces, estimates that there are 1,000 worker co-ops with approximately 10,000 worker-owners in the US.[152]

BOX C.2

Example: Building the Cooperative Movement in Jackson, Mississippi

Cooperation Jackson was founded in 2014 in response to chronic unemployment and impoverishment in Jackson, Mississippi, resulting in part from decades of disinvestment, deindustrialization, and suburban flight.[153] Its mission is to build "a solidarity economy anchored by a network of cooperatives and other types of worker-owned and democratically self-managed enterprises," which it understands as inclusive of "a wide array of economic practices and initiatives that share common values" such as cooperation and sharing, social responsibility, sustainability, equity, and justice.[154] In the long term, Cooperation Jackson envisions developing an interdependent network of cooperatives that will include a federation of local worker cooperatives, a cooperative incubator, a cooperative education and training center, and a cooperative bank or financial institution. It believes that organizing and empowering workers, particularly Black and Latino workers, to build worker-organized and -owned cooperatives can help expand economic opportunity, reduce racial inequities, and promote sustainability by creating jobs with dignity, stability, living wages, and quality benefits.[155]

Cooperation Jackson's network of cooperatives currently includes an urban farming co-op producing naturally grown produce, a landscaping and composting cooperative, and a catering and café cooperative.[156] It also plans to launch a community production cooperative, which will help expand sustainable manufacturing in Jackson; a series of housing cooperatives to provide quality affordable housing for working class communities; and construction and waste management cooperatives that will help build an ecosystem of sustainable community development institutions in Jackson.[157]

Through these efforts, Cooperation Jackson is both empowering residents to come together to meet their own needs, and in so doing, helping to advance the cooperative movement—and solidarity more broadly—in Jackson and beyond. As a founding member of Cooperation Jackson noted, "we're creating a model in which people can engage in a process of learning how to be democratic with each other,"[158] in hopes that that model "will encourage and enable workers in other cities and municipalities in Mississippi, the South, and throughout the United States to implement their own initiatives to promote economic democracy, solidarity economics, and cooperative development."[159]

REGIONAL/LOCAL

Cooperatives have a long history in California. The first cooperatively-owned store in California opened in 1867 in San Francisco,[160] and cooperatives remain one of "the most enduring features of the California landscape today."[161] Agricultural cooperatives are responsible for processing and marketing more than one third of California's food and fiber products.[162] While it is difficult to obtain data on cooperatives in the Central San Joaquin Valley specifically, agricultural and food cooperatives

are likely to be located in the region, and other forms of collective ownership may be gaining traction as well. For instance, two community land trusts—organizations which steward land collectively for the benefit of the community—were founded in the Fresno region in the last decade.[163]

Opportunities and Considerations

The cooperative model offers opportunities to empower communities in the Central San Joaquin Valley to create more inclusive, equitable, and sustainable economies. In particular, the emphasis that cooperatives place on shared prosperity and community benefit may help address the region's persistent issues of income and wealth disparities and the prevalence of low-quality jobs. While cooperatives can be established in any industry, several industries may offer particularly relevant opportunities for the Central San Joaquin Valley, including food and clean energy.

OPPORTUNITIES

California has a number of laws supporting cooperatives, including the Consumer Cooperative Corporation Law and the Worker Cooperative Act (AB 816), which was passed in 2015 to ease worker co-op formation and incorporation.[164] Most recently, the California Employee Ownership Act (SB 1407) was signed into law in January 2023, which will create an Employee Ownership Hub within the Governor's Office of Business and Economic Development that will help established businesses transition to employee ownership and support the growth of existing employee-owned enterprises.[165] As it stands, California is already home to many cooperatives,[166] which suggests a supportive environment for both establishing new cooperatives and growing existing ones in the Central San Joaquin Valley.

There are several types of co-ops present in the food industry, including agriculture co-ops, also known as farmer co-ops, which enable farmers to pool their resources in certain areas of activity. This type of co-op is well-established both in California and in the US, and, given the predominance of agriculture in the Central San Joaquin Valley, may be a promising opportunity for the Valley CERF coalition to pursue. Agriculture cooperatives can be structured in many different ways, but the most common types of agricultural co-ops in the US are marketing co-ops, which process and sell members' products; supply co-ops, which purchase products and services collectively to obtain better prices; and service co-ops, which provide members with specialized services like horticultural advice.[167] Regardless of the structure, as with all co-ops, agriculture cooperatives are owned and democratically controlled by their members, which means that all members can benefit equitably from the cooperative's profits.

Cooperatives are also making progress in the renewable energy space. Electric cooperatives currently serve 42 million people in 48 states, and, over the past decade, have succeeded in doubling their renewable capacity.[168] Most electric cooperatives focus on distribution, but some also generate their own power or purchase power on behalf of their members. As of 2022, the majority of electric co-op renewable capacity came from wind, although solar is a growing share.[169] While electric cooperatives were historically founded to provide electricity to rural areas, which were often denied service by investor-owned utilities, electric co-ops are becoming popular in urban areas as well. Communities in cities across the country are coming together to either purchase renewable energy in bulk or to create small-scale, community-owned energy sources that provide clean energy (most commonly, solar energy) to residents who might not otherwise have access.[170] In 2022, California passed a bill requiring its public utilities commission to design new programs to support community solar projects and ensure that these projects benefit lower-income households.[171] Given the interest in renewable energy in the Central San Joaquin Valley, and many of the benefits that cooperatives offer, renewable energy cooperatives (particularly solar) are another promising option for the Valley CERF coalition to pursue.

CONSIDERATIONS

Two key considerations in increasing the number and long-term success of cooperatively owned businesses are the robustness of the enabling ecosystem and the extent of community capacity. One movement leader noted that the cooperative ecosystem in the Central San Joaquin Valley is comparatively less developed than in other areas of California, such as the Bay Area and Los Angeles, which may then demand investing in regional supports for cooperatives. Because cooperatives are local and community-led, growing the cooperative movement also requires significant community capacity and commitment, which may require local, state, or federal support to develop. As another movement leader noted, there is currently a large gap between interest in advancing cooperative economies, and the ability to work towards, let alone deliver, one. Building a cooperative economy will likely require significant investments in the infrastructure and ecosystem (see the Policies and Other Levers section below), both locally and regionally, as well as investments in building the capacity of community members to lead the way.

Policies and Other Levers

Supportive policies, programs, and other levers are critical to ensuring an ecosystem that advances a cooperative economy. Some of the key ways that local and regional governments can create such a supportive ecosystem for co-ops include crafting policies that enable—and ideally actively encourage—

cooperative enterprises to start and thrive, as well as investing in and otherwise fostering supportive networks that provide the unique types of capital, education, technical assistance, and other resources that cooperatively-owned businesses need.

ENABLING

- **Legislative and administrative policies.** Moving towards a cooperative economy will require incentivizing businesses and other institutions to value cooperation over competition, as well as making it easier for them to do so. Ways to do this may include adopting general incorporation statues that enable cooperatives to form and operate effectively; adjusting existing regulations and programs to include cooperatives; providing dedicated capital and other types of financial support to cooperatives; and modifying public procurement policies to preference cooperatives (Theodos et al. 2020).
- **Education and technical assistance.** Cooperatively owned enterprises are businesses, but because of their shared ownership structure, need different types of capital, education, technical assistance, and other necessary business development resources. Movement leaders emphasized the importance of ensuring these tailored supports are available and accessible. Education and technical assistance are also critical in supporting existing businesses with transitioning to employee ownership (Funk and Trenholm 2021).
- **Fostering and resourcing supportive networks.** Growing the cooperative movement requires creating a robust enabling ecosystem, which includes supportive networks or hubs that can connect local cooperatives to each other as well as to organizations that can liaise between community-based organizations and institutional actors. For instance, the Network of Bay Area Worker Cooperatives serves as a community resource for those interested in workplace democracy in the Bay Area.[172] Movement leaders emphasized the importance of bringing people and organizations together to build solidarity, recognize each other's interests, and foster opportunities for collaboration and connection.
- **Narrative and culture change.** Movement leaders also highlighted the need to shift the narrative away from the current dominant culture of profit-driven and zero-sum competition to a culture that operates on the values of cooperation, solidarity, and mutuality, and that aims to create equitable and sustainable economies that serve everyone well.

CONSTRAINING

- **Procurement and other policies.** One leader noted that lowest-bid and other similar public procurement policies can often be a barrier to cooperatives and other social enterprises that

do not compete on price alone—amendments to these policies, such as by contracting using "best value" instead of "lowest bid," can help level the playing field for cooperatively-owned businesses to compete.

- **Outdated systems**. Another constraint is that many of our existing systems are not set up to recognize or support cooperative business models (Abell et al. 2021). For instance, certifications that allow businesses to identify themselves as women- or minority-owned are unable to account for a majority women- or minority-employee-owned business. Building a cooperative economy will require reforming these systems to not only recognize, but also incentivize, cooperative ownership.
- **Lack of capital and technical assistance.** As noted above, the unique ownership structure of co-ops creates the need for tailored capital and technical assistance. Meeting these needs will require reforms in current lending practices and dedicated funding for technical assistance providers.

Circular Economies

A Circular Economy is generally understood to be a model of production and consumption in which waste is reduced to a minimum and materials are recycled whenever possible, in contrast to the traditional "linear" economy, where resources are extracted to produce goods that are subsequently consumed and then discarded (Kirchherr et al. 2017).

The European Parliament defines the Circular Economy as "an economic model based on sharing, leasing, reuse, repair, refurbishment, and recycling, in an (almost) closed loop, which aims to retain the highest utility and value of products, components, and materials at all times (European Parliament 2016) (see Figure D.1).

FIGURE D.1

Linear vs Circular Economies

Source: m.malinika/Shutterstock

Table D.1 includes a summary of the key elements and benefits of Circular Economies and Box D.1 summarizes key opportunities and considerations, all of which are explored in more detail in the pages that follow.

TABLE D.1

Key Elements and Benefits of Circular Economies

Key Elements	Key Benefits
▪ Eliminate waste and pollution ▪ Circulate products and materials (at their highest value) ▪ Regenerate nature	▪ Economic development ▪ Jobs ▪ Innovation and economic competitiveness ▪ Greater customer interaction and loyalty ▪ Reductions in greenhouse gases and other emissions ▪ Reductions in material use ▪ Protect biodiversity

Source: Urban Institute analysis

BOX D.1

Advancing a Circular Economy in the Central San Joaquin Valley

Emerging evidence suggests that Circular Economy principles can support significant strides towards advancing CERF goals on economic health and climate action, including by contributing to greater innovation and economic competitiveness and reducing emissions and material use. While the framework has been criticized for a lack of attention to equity, scholars and practitioners are increasingly beginning to identify ways in which social considerations can be integrated into Circular Economies. Much of the existing research on Circular Economies, however, has been conducted (or funded) by one organization, and, because few economies can claim to be fully circular today, most of the benefits are promising rather than proven.

Nonetheless, the Circular Economy framework has gained traction globally, including in California, over the last two decades. The state has passed many bills in recent years regulating waste and recycling and supporting reuse and repair, all of which align with key circular principles, and many California cities have also implemented policies aligned with the Circular Economy framework.

The Valley CERF coalition can capitalize on this momentum in multiple ways, including by creating conditions that enable and incentivize circularity in the region and applying circular principles to local and regional decisions. The food (inclusive of agriculture) and manufacturing industries offer particularly promising opportunities for the region to advance a Circular Economy—some potential opportunities include eliminating manufacturing waste and pollution, finding productive uses for agricultural byproducts, and practicing regenerative agriculture. In the short and medium term, policies (at the local, state, and federal levels) that incentivize or mandate circular practices are likely to be most effective at advancing a Circular Economy, though funding for circular initiatives and business supports will also be important.

Key Elements

The Ellen MacArthur Foundation, widely considered to be the leader in the contemporary popularization of the Circular Economy concept (Ekins et al. 2019), has supported a lot of research on the topic over the last decade. Based on that research, they suggest the following as three key principles for the Circular Economy:[173]

Eliminate waste and pollution

Circular Economy proponents point out that "waste is actually the result of design choices."[174] By treating waste as a design flaw, instead of an inevitable feature, they argue that linear systems can be turned into circular ones and waste—along with the accompanying pollution and other environmental degradation it generates—can be eliminated. Ways to reduce waste include better designing products and processes to require fewer inputs (be they materials, energy, water, or otherwise) and to ensure products and materials can be recirculated for other users and uses for as long as possible; better managing outputs (including byproducts such as emissions, water, leftover materials); and actively recirculating products and materials for other users and uses for as long as possible.

Circulate products and materials (at their highest value)

Keeping products and materials in use for as long as possible not only contributes to reducing waste and unnecessary consumption, but also helps retain the value of the products and materials and helps curtail our environmental impact by minimizing the need for resource extraction. Circulating products and materials at their highest value can be achieved through several strategies, including by capturing and repurposing any "waste" generated and changing consumption patterns from owning to renting and sharing.

The Ellen MacArthur Foundation distinguishes between two fundamental cycles related to circularity: the technical cycle and the biological cycle. In the technical cycle, products and materials are kept in circulation through processes such as reuse, repair, remanufacture, and recycling. In the biological cycle, biodegradable materials are returned to the earth through processes like composting, which allows valuable nutrients to regenerate the land.

Regenerate nature

Circular Economy principles also require a shift from extraction to regeneration, the latter of which involves going beyond simply reducing environmental harms to actively improving the environment. This can include a range of activities, including returning beneficial biological materials to the land, as described above, or employing practices like regenerative agriculture that help build natural capital instead of depleting it.

Benefits

The promised benefits of a Circular Economy, some of which are outlined below, align with CERF goals around economic health, competitiveness, and resilience and climate action. Circular Economies also have the potential to advance equity, if implemented thoughtfully.

ECONOMIC HEALTH, COMPETITIVENESS, AND RESILIENCE

- **Economic development**. A 2015 book on the Circular Economy, *Waste to Wealth*, estimated that transitioning to a Circular Economy could generate $4.5 trillion in additional economic output globally by 2030 (Lacy and Rutqvist 2015). The Ellen MacArthur Foundation suggests that Circular Economies can achieve increased revenue from emerging circular activities and lower production costs through the more productive utilization of inputs.[175]
- **Jobs.** The International Labour Organization estimates that the transition to a Circular Economy could create 6 million new jobs globally.[176] A 2015 review of literature on the relationship between Circular Economies and employment found that transitioning to a Circular Economy generally had positive impacts on employment and job creation (Horbarch et al. 2015).
- **Innovation and economic competitiveness.** Some suggest that Circular Economies can spur innovation, leading to more technological development, better materials, and greater efficiency. In particular, in the manufacturing industry, the cost of acquiring raw materials can often create a competitive disadvantage for firms. Reducing the need for often-costly raw materials, and increasing the security of supply chains, can thus contribute to greater competitiveness (McKinsey 2016).
- **Greater customer interaction and loyalty**. Some have argued that circular-aligned business models that promote sharing over owning, such as businesses that rent or lease, can help businesses establish longer-term relationships with customers.[177]

CLIMATE AND ENVIRONMENTAL

- **Reductions in greenhouse gases and other emissions.** Research conducted by the Ellen Macarthur Foundation found that transitioning to a Circular Economy could help reduce global greenhouse gas emissions by up to 45 percent in key areas (Ellen Macarthur Foundation 2019), with the largest sources of reductions coming from transitioning to electric and shared vehicles; reducing food waste; practicing regenerative food chains; and using renewable energy (Ellen MacArthur Foundation 2015; McKinsey 2016). Other research on high impact actions to reduce greenhouse gas emissions similarly highlight shifting to renewable energy and reducing food waste as among the top ten most effective solutions, in addition to other actions in alignment with circular principles, such as ecological restoration.[178]

- **Reductions in material use.** A 2015 study by McKinsey and the Ellen MacArthur Foundation estimated that transitioning to a Circular Economy could decrease primary material consumption by 53% in the European Union (Ellen MacArthur Foundation 2015). The extraction and processing of natural resources currently contributes to more than half of global greenhouse gas emissions and more than 90 percent of global biodiversity loss.[179] Substantially decreasing the need for non-renewable raw materials would thus significantly curtail our impact on the environment.
- **Protect biodiversity.** Working towards a Circular Economy can help protect biodiversity and human health by reducing the waste streams that harm the environment, workers, and those living in proximity to dump sites.[180] For instance, Circular Economy solutions have been estimated to be able to reduce the flow of plastic waste into the ocean by 80 percent in 20 years.[181] Biodiversity is essential to maintaining healthy and resilient ecosystems, which in turn supports life on earth. A commonly used, albeit important, example is that without pollinators such as birds and bees, we would not have apples, cherries, blueberries, and many other foods.[182]

EQUITY

One common critique of the Circular Economy framework is that it emphasizes business and technical solutions and often fails to incorporate social and political considerations (e.g., Korhonen et al. 2018; Murray et al. 2015), such as distributional equity and power dynamics. However, both scholars and practitioners are beginning to consider how to integrate social equity into Circular Economies, including by:

- Refining the definition of the Circular Economy to include social and political concerns (James 2022; Gyori 2022),
- Applying the principles of a "just transition" to the Circular Economy, such as combining Circular Economy policies with social protection measures to ensure that no one is left behind (Schröder 2020; Drew et al. 2020), and
- Adapting the framework to enable localized Circular Economies that prioritize the knowledge of local residents as well as maximize benefits and minimize harms to marginalized communities (Wuyts and Marin 2022; Hartmann et al. 2022; Rosenbaum and Kendy 2022).

Prevalence and Adoption

The Circular Economy framework is being applied in many places across the globe, including in the United States and in California, and is being supported by public policies as well as private practices.

GLOBAL

The United Nations' Sustainable Development Goal 12, adopted in 2015, calls for ensuring sustainable consumption and production patterns,[183] which aligns with circular principles. Policymakers in some countries have put forth proposals adopting Circular Economy principles. For example, the European Commission proposed a Circular Economy package in 2014 that included measures on waste management, producer responsibility, and promoting reuse (European Parliament 2016), and in 2020 adopted a Circular Economy action plan that aimed to "establish a strong and coherent product policy framework that will make sustainable products, services and business models the norm and transform consumption patterns so that no waste is produced in the first place."[184]

Many private actors have also been enthusiastic about adopting Circular Economy principles. In 2018, for instance, the World Economic Forum launched the Platform to Accelerating the Circular Economy (PACE), a public-private collaboration with the goal of helping global changemakers accelerate the transition to a Circular Economy.[185]

However, despite these efforts, the 2023 Circularity Gap Report, an annual report first published in 2018, found that the global economy is currently 7.2 percent circular, meaning that only 7.2 percent of resources are recycled or reused and the remaining 92.8 percent of materials are either wasted, lost, or remain unavailable for reuse for years. This represents a decrease of almost 2 percent from the first measurement of 9.1 percent in 2018, driven by rising material extraction and consumption (Circle Economy 2023).

NATIONAL

In 2021, the US Environmental Protection Agency (EPA) outlined the Circular Economy Strategy Series, a 10-year vision to work towards a Circular Economy and address climate change. This vision includes a National Recycling Strategy, strategies to reduce plastic waste, and other actions.[186] Many of these strategies received funding from the 2021 Infrastructure, Investment, and Jobs Act and are in the process of being implemented.[187] In addition, Congress passed the Save our Seas 2.0 Act in 2020, which mandates the EPA to undertake a number of actions to reduce the flow of plastic waste into oceans and waterways, including identifying innovative uses for plastic waste and creating incentives for new end-use markets for recycled plastics (EPA 2022). In February 2023, the White House Office of Science and Technology also hosted a roundtable to explore ways to accelerate innovation to

achieve a net-zero, circular economy, suggesting increased attention to Circular Economy concepts, beyond only recycling, in the US.[188]

While is it difficult to estimate the size of Circular Economy businesses and initiatives in the US, a 2018 report on the state of the Circular Economy in the US catalogued more than 200 US-based Circular Economy initiatives, ranging from ones focused on material innovation to ones focused on design and product life extension.[189] Many US cities have established zero-waste goals,[190] and some, such as the city of Boulder in Colorado, have moved beyond zero-waste to set explicit goals on circularity (see Box D.2 for an example of zero waste and Circular Economy initiatives in Austin, Texas).[191]

BOX D.2

Example: Zero Waste and the Circular Economy in Austin, Texas

The City of Austin established its first zero waste goal in 2005. Four years later, in 2009, it published a Zero Waste Strategic Plan, followed by the Austin Resource Recovery Master Plan, which called for the city to divert at least 90 percent of its waste by 2030.[192] Today, Austin's plan has evolved beyond only managing materials at the end of their lifecycle, and instead aims to foster a truly circular economy, considering factors such as how products can be designed better, how they can remain in use for longer, how they can be shared to reduce overall consumption, and more. This evolution was reflected in the city's rebranding of its Solid Waste Services Department as the new "Austin Resource Recovery."[193]

Because Austin Resource Recovery only directly manages 15 percent of the city's waste, it works closely with public and private stakeholders to establish programs and policies that can help achieve the city's zero-waste and other circular-aligned goals. These include a Universal Recycling and Composting Ordinance requiring all properties to provide recycling services, a Construction and Demolition Recycling Ordinance requiring building projects to reuse or recycle at least 50 percent of construction debris, as well as a Single Use Products and Packaging Ordinance, which regulates single-use paper and plastic bags.[194] Austin Resource Recovery also runs a number of programs, in partnership with the city's economic development department, to promote circular practices among the city's residents and businesses. These include Fix It clinics and repair workshops, where residents can learn repair skills and bring items to be repaired, as well as a competition for local businesses to pitch their surplus materials to investors and other entrepreneurs.

Austin's circular ambitions are not limited to only material impacts, either—an interviewee from Austin Resource Recovery noted that the department has an equity office and tracks a number of different metrics to ensure that they are serving residents in an equitable manner. One of its programs, which created temporary drop-off stations for students moving off campus to donate gently used items, resulted in more than half a million dollars in recovered material that directly

benefited thousands of under-served Austin residents, more than $50,000 in property manager savings, and more than 223 tons of material diverted from local landfills.[195]

While Austin has benefited from strong local support and dedicated revenue sources, which has helped the city achieve 42 percent waste diversion as of 2021, it was nonetheless behind its target of 75 percent diversion by 2020.[196] Local officials have acknowledged that the city is behind on its goal, and suggested that more support from the state is needed to outlaw products and materials that are difficult or impossible to recycle, such as Styrofoam and single-use plastic bags.[197]

REGIONAL/LOCAL

The Circular Economy has gained traction in California as well. In recent years, the state has passed a number of bills that regulate waste and recycling, including a bill requiring all packaging to be either fully recyclable or fully compostable by 2032.[198] Most recently, in October 2023, California passed a right-to-repair act that makes it easier for consumers to repair devices independently by requiring producers to make available the necessary tools, parts, and documentation for seven years after production.[199] Many California cities have also implemented policies aligned with a Circular Economy—for instance, San Francisco adopted a zero-waste goal in 2002, and the City of Fresno passed a mandatory recycling ordinance in 2005.[200]

Opportunities and Considerations

The Circular Economy framework, if implemented thoughtfully and with an eye to the region's dominant industries like manufacturing and food, offers opportunities to advance not only climate action and economic resilience, but also social and racial equity in the Central San Joaquin Valley.

OPPORTUNITIES

- **Eliminating manufacturing waste and pollution.** Manufacturing is the seventh largest industry in the Valley CERF region and the fourth largest in Kings County (CVCF 2023). As noted above, the manufacturing industry currently relies heavily on raw materials and resources like water and energy. Thus, there is a significant opportunity to support manufacturers based in the Valley CERF region to apply Circular Economy principles to the products they make and the processes they use to make them, which can reduce non-renewable raw material inputs, water and energy use, and waste outputs. Some organizations in the Valley CERF region are already pursuing these approaches—one example is BEAM Circular, an initiative based in the

North San Joaquin Valley that is scaling promising circular innovations in the bioeconomy, agriculture, and manufacturing industries.

- **Finding productive uses for agriculture byproducts.** Current practices for disposing of agricultural and animal waste cause significant environmental challenges, including the emission of greenhouse gases and surface water contamination. In 2021, the California Air Resources Board announced a near-complete phase-out of agricultural burning in the San Joaquin Valley—by 2025, only very limited open burning of agricultural material will be allowed.[201] In response to this mandate, the California Legislature appropriated $180 million to incentivize alternatives to agricultural burning in the Valley.[202] The combination of the phase-out and the funding present an opportunity for the industry to invest in alternative, productive uses for agriculture byproducts. For instance, technologies such as anaerobic digestion and pyrolysis enable byproducts like used animal feed and manure to be turned into higher-use products like energy or compost (EPA 2023).
- **Reusing scarce water resources.** The management of water resources is a key challenge for the Central San Joaquin Valley given increasing water shortages, state groundwater regulations, and the current high demand for water from dominant industries such as agriculture and manufacturing (CVCF 2023). The Central San Joaquin Valley could address this challenge with Circular Economy principles and capture, purify, and reuse its water. The Valley CERF coalition could look to cities such as Oceanside in Southern California, which recently opened a water purification facility intended to recycle enough water to provide approximately 30 percent of their current water supply. Not only does reusing water in this way reduce Oceanside's impact on local rivers and deltas, it also reduces its vulnerability to climate change, drought, and other disasters. Oceanside also intends to use some of the purified water to replenish its groundwater aquifers, thus also helping to regenerate nature.[203]
- **Practicing regenerative agriculture.** The agriculture, forestry, fishing and hunting, and mining industry is the third largest industry in the four-county Valley CERF region and the largest industry in Madera and Tulare counties (CVCF 2023). Thus, there is a significant opportunity for impact in supporting farms in the Valley CERF region to apply the Circular Economy principle of regenerating nature, which can also support the long-term health of both businesses and the land. Regenerative agricultural practices can help cultivate healthy and productive soils instead of stripping them of nutrients, which in turn helps increase food output—and farmers' profits—while also improving carbon sequestration. Planting a greater variety of crops and rotating between different types of crops can also reduce soil erosion and

help with pest management,[204] among other benefits. Additional innovations to advance regenerative agricultural practices could also help improve job quality for farm workers and reduce their exposure to hazards such as extreme heat.[205]

CONSIDERATIONS

As noted above, while the Circular Economy framework emphasizes both climate action and economic health and resilience, the focus on equity remains nascent—the framework is currently largely agnostic on who might benefit from the economic and environmental benefits it may bring. Should the Valley CERF coalition choose to make investments to advance a Circular Economy in the region, it will need to intentionally embed equity, including by adopting some of the practices suggested in the Benefits: Equity sub-section of this chapter. The city of Boulder, for instance, established seven pillars of the Circular Economy to guide its work, three of which are related to social factors, including the health and wellbeing of both humans and other species, and generating value beyond only financial.[206]

Additionally, representatives from leading Circular Economy organizations noted that many Circular Economy practices strongly benefit from coordination between actors throughout the supply chain, as well as clear standards for businesses to follow. And, while there is much that can be done locally and regionally to support Circular Economies, support from the state and federal government will likely also be required to enable coordination at the scale needed.

Policies and Other Levers

In order to advance a Circular Economy, attention on both creating an enabling and incentivizing policy and practice environment, as well as eliminating constricting policies, is critical. Local and regional governments can also help catalyze and scale circular practices in other ways, including by leveraging their purchasing power.

ENABLING

- **Create plans and set targets.** Local and regional governments can catalyze action towards circularity by creating roadmaps or action plans to guide public and private action. They can also set clear targets and help align the various actors. For example, as noted above, many cities have adopted "zero-waste" goals in recent decades, which are supported by coordinated efforts across the public and private sectors.
- **Encourage the adoption of circular practices and create conditions that enable and incentivize circularity.** Local and regional governments can encourage or even require

businesses and residents to adopt circular-aligned practices, such as by banning the use of single-use plastics. As noted above, California's recently passed right-to-repair act supports the ability of consumers to circulate products by making it easier for them to repair devices independently. Changes to other policies and programs, such as procurement guidelines and consumption taxes, can also incentivize circularity instead of linearity.[207]

- **Support for circular business innovations.** Representatives from leading Circular Economy organizations highlighted the importance of business development and other supports that enable circular businesses to start and thrive, from providing start-up funding to creating incubators and support networks, as well as providing technical and financial assistance to support existing businesses to transition to circular practices. Business attraction efforts could also be leveraged to draw circular businesses to the region.
- **Apply circular principles to local and regional decisions.** Circular principles can be applied to many local and regional decisions well beyond waste collection and recycling. Local and regional actors can prioritize circular principles when making decisions about the design, construction, and deconstruction of infrastructure and the rest of the built environment; the restoration of local ecosystems; household consumption; and more.

CONSTRAINING

- **Industry resistance and policies preempting circular practices**. Some Circular Economy experts noted that resistance from large, powerful industry actors may serve as obstacles to achieving circularity regionally and even nationwide. Plastic preemption laws, for instance, which prevent restrictions on single-use plastics like bags, utensils, straws, and polystyrene containers, have been championed by the plastics industry and its lobbyists, including through the creation of model legislation on plastic preemption for state legislators to introduce nationwide.[208] States such as Florida, Iowa, Mississippi, and Missouri have preempted municipalities from adopting local laws to regulate plastic pollution. These and other similar policies prevent communities from achieving circularity.
- **Lack of consistent standards.** Another constraint currently holding back the Circular Economy is the lack of national, let alone international, manufacturing and end-of-life standards.[209] A lack of consistent standards results in higher levels of waste, since products cannot be recycled consistently, as well as a proliferation of third-party certifications that may confuse and mislead consumers.

Fair Trade Economies

Fair trade is movement aimed at improving the lives of workers by ensuring fair wages, dependable contracts, safe working conditions, reinvestments into communities, and environmentally responsible practices (Dragusanu et al. 2014).

While the fair trade movement has its roots outside the US, with a focus on lower income countries, many American businesses buy and sell certified Fairtrade products, and a growing number of factories and farms in the US are becoming Fairtrade certified.[210]

For the purpose of this fact sheet, it is helpful to distinguish between fair trade, a term used to describe the general movement with no specific reference to a certification; Fairtrade, the certification; and the three main certifying bodies: the World Fair Trade Organization (WFTO), Fairtrade International, (of which Fairtrade America is an affiliate), and Fair Trade USA. Each body certifies and audits contracts formed between producers and buyers.[211] According to an expert in Fairtrade certification, Fairtrade certifying organizations often honor each other's certifications, allowing producers and manufacturers to only seek one certificate, saving them time and resources.

Below, Figure E.1 from Fair Trade USA, summarizes the flow from producer, supplier, consumer, and back to producers in the form of reinvestment. The WFTO, Fairtrade International, and Fairtrade America have similar supply chain frameworks and distribute throughout the world.[212] Fairtrade certified products are often sold at a premium, which supports the payment of fair wages and sustainable production.[213]

FIGURE E.1

Fair Trade Benefits and Supply Chain Framework

Source: *Fair Trade USA*

Table E.1 includes a summary of the key elements and benefits of fair trade and Box E.1 summarizes key opportunities and considerations, all of which are explored in more detail in the pages that follow.

TABLE E.1

Key Elements and Benefits of Fair Trade

Key Elements	Key Benefits
▪ Prices that support the livelihood of producers	▪ Living wages
▪ Premiums and community reinvestment	▪ Producer and community wellbeing
▪ Environmentally friendly practices	▪ Resilience and stability in fluctuating markets
▪ Yearly contracts and access to credit	▪ Environmental protection
▪ Worker protections and prohibition of forced labor	▪ Mitigating and planning for climate change
	▪ Improving gender equity in the workplace
	▪ Right to unionize
	▪ Regulated working hours

Source: Urban Institute analysis

BOX E.1

Advancing Fair Trade in the Central San Joaquin Valley

Data shows proof and promise that adopting fair trade standards can advance CERF goals on economic health and climate action, including by improving wages and working conditions for workers in the region—especially those in agriculture and manufacturing; improving business stability; advancing economic democracy and equitable community and economic development; and advancing climate change mitigation, adaptation, and resilience.

Much of the success of the fair trade movement has been driven by relationship-building with individual businesses. Thus, scaling outreach to and technical assistance and capital for agribusinesses and manufacturers about fair trade principles, how they can benefit their business, and specific ways to incorporate and implement them into operations can help increase adoption. However, without policy solutions—such as procurement, tax code, and regulations—and expanded programmatic efforts, fair trade may have limited scalability.

Key Elements

Each Fairtrade certifying body has its own unique set of standards that guide the requirements needed for a producer or a supplier to receive the label, however there are common themes that can be found throughout all of them including, the guarantee of a living wage, price premiums put towards community and economic development, climate-forward practices, stable contracts and access to early financing, and worker protection policies.

Provide Prices that Support the Livelihood of Producers

A key tenet is providing prices that support the livelihood of producers. The minimum price, or price floor, must cover the average cost of sustainable production and meet a broadly determined living wage in the sector. The buyer is required to pay the established minimum price even when the market price is below that negotiated base price, which helps ensures that when market prices fall or fluctuate, workers are still receiving a living wage (Dragusanu et al. 2014). Fairtrade International and Fairtrade America maintain a Fairtrade Minimum Price and Premium Table that is used to determine both the price floor for a certain commodity and the premiums associated with it for when producers and suppliers enter into a Fairtrade contract.[214]

Premiums and Community Investment

In addition to the agreed upon sales price, the buyers also must pay a premium to the producers.[215] The premium is paid on top of the negotiated minimum price and is intended to be used by workers on the production side to invest in community projects of their choosing (Dragusanu et al. 2014). Decisions on what community projects to invest in are made following a democratic process, and are usually put towards investments meant to support productivity or strengthen the community (e.g., building schools, health clinics, and farm storage facilities).[216]

Environmentally Friendly Practices

The fair trade movement aims to not only advance the health and well-being of workers, but also of the planet. Bridging both, Fairtrade International and Fairtrade America mandate environmentally friendly farming practices and encourage producers to create a climate change adaption plan.[217] Additionally, the fair trade movement prohibits the growing of genetically modified crops (GMOs) and requires producers to generate environmental reports documenting their use of pesticides and hazardous materials.[218]

Yearly Contracts and Access to Credit

In order to develop a stable relationship between producers and buyers, certified buyers must agree to at least a one-year contract with certified producers, but the contract is usually longer, which supports all contracted parties (Dragusanu et al. 2014). Beyond that, Fairtrade Certified producers may request a percentage of the contract value for pre-financing. Gaining access to financial assistance to support necessary purchases for production can help producers scale. The exact percentage of pre-financing is determined by the producer but cannot exceed 60%. Producers are encouraged to document a complaint to Fairtrade International if they feel like they are being coerced into not requesting pre-financing.[219]

Worker Protection and Prohibition of Forced Labor

The fair trade movement strictly prohibits forced labor and attempts to fight the root causes of worker exploitation, including by providing living wages. For example, Fairtrade International and Fairtrade America have a Protection Policy and Procedure for Children and Vulnerable Adults that states when forced labor is found in a Fairtrade Certified supply chain, the situation must be reported to Fairtrade International and Fairtrade America for assessment, response, and prevention.[220] If child or forced labor is identified, Fairtrade requires the producer to remove the person from work immediately, develop and fund remediation projects to address root causes, and establish a risk improvement plan

to mitigate further risk. The producer can request support from Fairtrade International in building monitoring and remediation system.[221]

Benefits

Much of research on the benefits of fair trade has been led by the Fairtrade International and Fair Trade USA, however there is also some third party research. Their research shows that Fairtrade practices support equitable economic opportunities as well as health and well-being for workers; environmental health and stewardship; accountability to and for stakeholders throughout the supply chain; and transparency for the consumer. This evidence shows that the benefits of Fairtrade align strongly with its goals, which can be assumed is due to the Fairtrade standards themselves and the subsequent audits and ongoing verification processes that regularly reaffirm the standards are being met by those seeking to gain and maintain the Fairtrade certification.

ECONOMIC HEALTH, COMPETITIVENESS, AND RESILIENCE

- **Living wages**. According to the World Bank, smallholder farmers around the world earn on average $2 a day and struggle to afford basic necessities.[222] The fair trade movement aims to help correct this through the guarantee of living wages. For example, data between 1989-2010 indicate that a price floor can provide significant risk protection to farmers who sell their coffee as Fairtrade Certified (Dragusanu et al. 2014); they earn about 40% more than producers who are not certified.[223] Within the manufacturing realm, Fairtrade Certified businesses guarantee their workers living wages within six years of certification, which has been determined to be a realistic timeframe given the large gaps between current low wages for many textile workers and living wages.[224]
- **Producer and community well-being.** Fairtrade premiums also support the health of local economies. For example, in 2021, producers certified by Fairtrade International that produced the top 7 products, received more than $200 million USD in price premiums ("Building Resilience in a Changing World" 2022). As previously noted, decisions on how to reinvest these funds are made democratically by the producers. Some producers may decide to reinvest in the workplace, enhancing worker wellbeing, while others may choose to invest in community projects, supporting community wellbeing. In 2020, among Fairtrade producers, the largest percentages of premiums went towards resources and administration (20%), updating facilities and infrastructure (20%), direct payments to members (16%), and provision of agricultural tools and inputs (13%).[225]

Fair Trade USA also offers premiums to producers for every Fair Trade USA Certified product that's sold. The premiums are called "Community Development Funds" and operate in a very similar way to those administered by Fairtrade International. Fair Trade USA developed the Fair Trade Needs Assessment to support producer and manufacturing organizations in deciding how these premiums should be spent. Through trainings and tools offered by Fair Trade USA, organizations can identify needs, design projects, and evaluate success.[226] In 2021, Fair Trade USA reported delivering $121 million back to producers and families through the Community Development Fund (Fair Trade USA Fact Sheet 2022).

- **Resilience and stability in fluctuating markets**. Prefinancing, which offers producers access to credit, allowed producers to mitigate the impacts of falling demand during the pandemic. For example, when the COVID-19 pandemic hit, Fairtrade producer organizations that were receiving early access to credit from buyers were 24% less likely to report a high impact from the pandemic. Additionally, the commodity price floors guaranteed producers more pricing predictability, even as the market rate was falling during the pandemic (Günther et al., 2022).

  The internationally recognized Fairtrade certification also helps farms and manufacturers be seen as trusted and reliable suppliers as well as fair employers to their workers. An expert in the fair trade movement posited that this aspect of Fairtrade also strengthens the overall supply chain. Ensuring the health, stability, and sustainability of the first links (producers and manufacturers) helps give confidence to the rest of the actors in the supply chain and increases their resilience during times of economic uncertainty.

CLIMATE AND ENVIRONMENTAL

Many people working in the first links of the supply chain are on the frontline of experiencing climate impacts that threaten their life and livelihood; further, industries like agriculture and manufacturing are large contributors to climate change and environmental degradation. To help address these concerns, Fairtrade International partnered with Gold Standard, a leader in climate security and sustainable development, to further develop Fairtrade International's standards related to environmental protection and climate change adaption, which were first introduced in 2015 (Fairtrade International, 2020).

- **Environmental protection.** The Fairtrade certification has standards to ensure production is environmentally sustainable and contributes to the protection of the environment. Standards prevent environmental degradation by prohibiting the use of some agrochemicals, identifying and avoiding land that is at risk of soil erosion in an effort to improve soil health, monitoring water usage, handling waste properly, and recycling when possible.[227] Furthermore, Fairtrade

International offers support to producers interested in pursuing organic certification through regional experts who work with the farmers, which has led to over 60% of Fairtrade producers also achieving organic certification.[228] [229]

Fairtrade premiums have also been used to invest in the environmental health of a community. For example, a producer organization in Kenya used their premiums to establish tree nurseries, provide trainings on organic composting, and reduce deforestation through tree plantings.[230]

- **Mitigating and planning for climate change.** The Fairtrade standards aim to grow climate mitigation practices through the reduction of greenhouse gas emissions and promotion of carbon sequestration. Producers are also encouraged to develop a climate change adaptation plan, inclusive of goals and a timeline.[231] Farmers are eligible for carbon credits, which they can sell as certified Fairtrade carbon credits to companies who are looking to offset their carbon footprint.[232] Since the program's inception, more than 80,000 carbon credits have become available for purchase.[233]

EQUITY

A key goal of the fair trade movement is achieving equity for workers who are at risk of harms such as low wages and unsafe working conditions. Fairtrade International aims to advance equity through minimum standards around wages, pricing, working conditions, transparency, and accountability throughout the supply chain.

- **Improving gender equity in the workplace.** The fair trade movement aims to improve gender equity in the workplace. For example, Fairtrade certified producers must abide by gender equity standards, including prohibiting discrimination on the basis of gender. [234] A Fairtrade expert noted that women also have a seat at the table regarding decisions on how to reinvest Fairtrade premiums. Female workers are also empowered to vote and take up leadership roles under the Fairtrade voting system, which is a right that some have been denied in their past.
- **Right to unionize.** Within the manufacturing industry, Fairtrade International and Fairtrade America have adopted strict requirements to ensure freedom of association so that workers can unionize.
- **Regulated working hours.** Working hours are regulated by the Fairtrade Standards for Hired Labour to increase workers' well-being and safety. Producer organizations must agree to announced and unannounced audits of their premise(s) to provide information in relation to Fairtrade Standards.[235]

Prevalence and Adoption

In a rapidly expanding global economy, the fair trade movement works to create connections between local economies across the world, as well as to develop deeper connections and increase transparency between producers, suppliers, and consumers. Consumers of certified Fairtrade products support an ethical supply chain, an uncommon characteristic of global supply chains today.

GLOBAL

Worldwide, there are currently more than 1,930 Fairtrade Certified producers that employ 1.9 million workers in 70 different countries.[236] Although the Fairtrade workforce is relatively small compared to the total working population, it is important to note there has been steady growth in the amount of Fairtrade workers since 2013; more than 640 producer organizations have been added.[237] Fairtrade premiums have also shown growth; the total Fairtrade Premium received by producers increased from $150 million in 2015 to $190 million in 2020.[238] Not only is the fair trade movement seeing increased adoption from the production side, it's also seeing increased demand on the consumer side. In 2023, GlobeScan and Fairtrade International released findings that showed half of shoppers surveyed in 12 different countries said they were willing to pay more for a Fairtrade Certified product.[239]

NATIONAL

According to a leader in the fair trade movement, most certified producers live and work in the Global South. However, because of the evolution of the movement and the need for ethical and sustainable supply chains within the US, there is a growing number of certified products being grown and manufactured by US-based farms and factories being certified.

For example, in 2021, 1,500 US brands—many national or multinational—carried one or more products with Fair Trade USA's certification mark.[240] As of 2023, 65% of consumers recognized the Fairtrade seal and 78% reported their trust in the label (Fair Trade Certified, 2023).

Other organizations, such as Fair Trade Campaigns, exist to mobilize consumers and increase the availability of fair trade products in their area through advocacy. Fair Trade Campaigns is a national effort launched in 2013 that has 236 chapters throughout the US. The chapters are found in congregations, towns, schools, and universities.[241] Fair Trade Campaigns has defined goals for the chapters, which can be found on their website.[242]

REGIONAL/LOCAL

Fairtrade certifying organizations haven't released reports on producer organizations in California, but in an interview, a leading expert in the fair trade movement confirmed that they have contracts with farms throughout the state. The California Fair Trade Business Association works to oversee a network of businesses carrying Fairtrade products across California. They support members through networking, resource and skill sharing, and promotion, aiming to grow the fair trade movement statewide. Through social media and events, the association highlights Fairtrade certified products—and the businesses that carry them—in California to raise awareness and increase the prevalence of both.[243]

Opportunities and Considerations

The adoption of fair trade principles can yield positive outcomes for producers, suppliers, and consumers throughout the Central San Joaquin Valley. Given Fairtrade's global focus on agriculture and manufacturing, and the strong presence of these industries in the region, Valley CERF has an opportunity to increase the prevalence of Fairtrade practices, if not certification, in the region.

OPPORTUNITIES

- **Strengthening the agriculture and manufacturing industries in the Central San Joaquin Valley**. Supporting agribusinesses and manufacturers in the Central San Joaquin Valley to meet Fairtrade standards can benefit workers, businesses, community, the environment, and the economy. According to a fair trade expert, the region's agriculture industry has a foundation to build on. For example, according to their assessments, current agricultural laws in California – if followed – effectively position farms 70% of the way towards meeting the Fair Trade USA requirement; this is because tracking water usage, pesticide application regulation, and water disposal management – among other practices—are shared requirements between the state of California and Fair Trade USA. The remaining 30% of the requirements needed to meet the Fair Trade USA mark would likely be around wages, working hours, and other practices related to worker health, safety, and well-being. This creates an opportunity to support agribusinesses across the Valley to not only comply with California law, but to take the next steps and pursue the remaining 30% of the Fairtrade standards.

- **Modeling policy and practice based on Fairtrade principles**. Policymakers and community and economic development practitioners can refer to Fairtrade standards to inform future legislation to set standards and guide practices in the private sector and within industries, such as agriculture and manufacturing, related to worker rights, health, and well-being; environmental health and climate action; and democratic decision-making around community and economic development efforts.
- **Leveraging procurement to increase the prevalence of Fairtrade products in the Valley CERF region.** The Valley CERF region has large anchor institutions in region; individually and together, they have significant purchasing power. This creates the opportunity to support these institutions, inclusive of local governments, to leverage their purchasing power to seek certified Fairtrade and other ethical products.
- **Using Fairtrade standards to support the well-being of undocumented workers.** The Valley CERF region is home to an estimated 143,000 undocumented immigrants (CVCF 2023). According to a leader in the US fair trade movement, fair trade standards, such as the price floor and the safe working conditions, have the unique ability to ensure undocumented immigrants have jobs that pay a fair wage and foster a healthy work environment. Additionally, because every producer organization democratically decides how to use their premiums from sales, undocumented immigrants in the Valley CERF region would have voice in informing how funds are used in their communities.
- **Accessing new markets.** The adoption of Fairtrade principles can benefit producer organization and businesses by expanding access to new markets, both locally and non-locally. Fairtrade certification can give producers a competitive advantage in the market, including by offering stable supply chains and appealing to values-based consumers. The Valley CERF region is already an exporter, so new markets may be appealing to the region's businesses.

CONSIDERATIONS

Due to the history of the fair trade movement focusing on producers in the Global South, the cost of Fairtrade service fees, and the current one-on-one relationship-building approach with businesses, it may take some effort to engage growers and manufacturers in the Valley CERF region regarding pursuit of the Fairtrade certification. However, because of the benefits that Fairtrade provides to workers, businesses, communities, and the environment, there is merit to making that effort. Regardless of pursuit of certification, Fairtrade principles and practices offer a roadmap for how the Central San Joaquin Valley can address its social, economic, and environmental challenges, and advance a high road economy.

Policies and Other Levers

Much of the growth of the fair trade movement appears to be the result of efforts outside the policy sphere. Programmatic supports, such as technical assistance, can however, be buttressed by funding and policy efforts.

ENABLING

- Supportive programming provided to agribusinesses and manufacturers, such as technical assistance about fair trade principles, how they can benefit their business, and specific ways to incorporate and implement them into operations can help increase awareness of Fairtrade principles and practices, overcome hesitations some business leaders may experience when considering fair trade, and reduce barriers to adoptions. This programming can be developed, and possibly implemented, in partnership with one or more of the US-based fair trade certifying bodies.
- Capital and other funding is critical for any business to thrive. As seen in the fair trade movement across the globe, up-front capital is also critical in supporting businesses to make necessary investments that help them strengthen their business in tandem with their fair trade practices. Developing creative financing mechanisms can support the region's businesses to adopt practices in line with fair trade principles, if not pursue fair trade certification.
- Procurement policies that create preferences for fair trade and other ethical products would incentivize businesses, such as producers and wholesalers, in the region to grow and source responsibly.
- "Sustainable business tax credits" or similar tax incentives incentivize businesses to practice social and environmental responsibility, including local sourcing, fair wages, and safe working conditions.[244]

CONSTRAINING

- Most of the success of the fair trade movement appears to be driven by relationship-building with individual businesses. This was perhaps driven by the absence of substantive policies. However, without expanded efforts to increase awareness, more capacity for the organizations leading the efforts, and – importantly – policy, the fair trade may have limits in scalability.

- Related, while there is data being collected from the leading national and international fair trade certifying bodies, more data documenting the impact of fair trade on workers, businesses, communities, and the environment is needed. The limited data may be a hinderance to awareness campaigns, if not adoption.
- According to an expert in the fair trade movement, the unique price premiums for every product can be overwhelming for the producers and the businesses that buy from them. Without the fair trade certifying bodies simplifying their pricing tables, producers and their buyers may need additional support in navigating these details.

Doughnut Economies

The Doughnut Economics framework was developed in 2012 by economist Kate Raworth to incorporate social and ecological goals, which tend to be ignored by mainstream economic models (Raworth 2017). Doughnut Economics aims to meet the needs of all people within the means of the planet.

The model is named after the doughnut-shaped space between the social foundation and the ecological ceiling, which is a space that is both socially just and ecologically safe (see figure F.1), and is presented as "a compass for human prosperity in the 21st century."[245] The goal of Doughnut Economics is for humanity to thrive within the boundaries of the doughnut, instead of continuing to pursue endless economic growth, which has thus far been at the expense of social and environmental wellbeing.

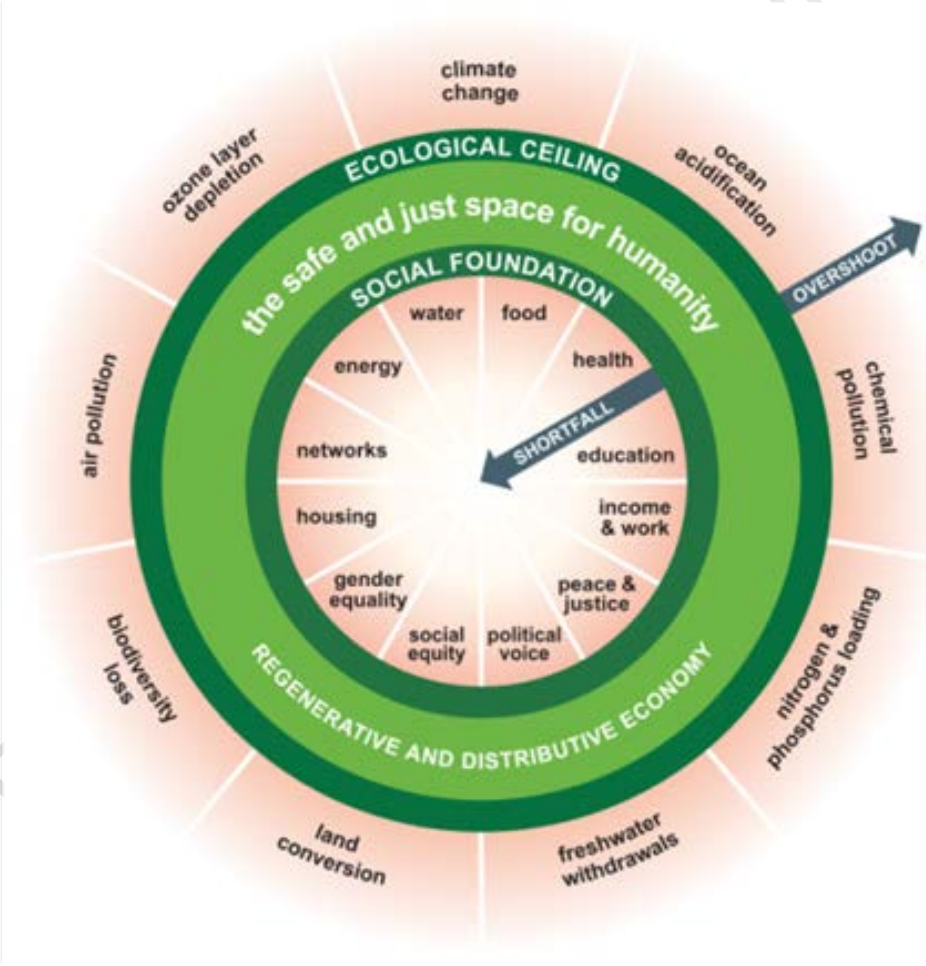
While the framework may seem largely theoretical, the Doughnut Economics Action Lab (DEAL), which was cofounded by Raworth in 2019, has published many tools to help changemakers in businesses, communities, and city and regional governments turn the ideas of Doughnut Economics into action. Some of these tools include:

- Doughnut Unrolled, a set of five tools to help communities and localities identify ways they can thrive within the doughnut, collect targets and indicators, explore specific strategies and identify related initiatives, and ultimately create a holistic "portrait of place" that can serve as a starting point for action.[246]

- Cities and Regions: Let's Get Started, a guide for local and regional governments offering nine pathways to engage with Doughnut Economics and put its principles into practice.
- Communities: Let's Get Started, a collection of tools and stories to help community members apply the ideas of Doughnut Economics in their place.
- Doughnut Design for Business, a tool to help businesses use the Doughnut Economics framework to become regenerative and distributive in their strategies, operations, and impacts.

FIGURE F.1

Doughnut Economics Framework



Source: Raworth 2017

Table F.1 includes a summary of the key elements and benefits of Doughnut Economies and Box F.1 summarizes key opportunities and considerations, all of which are explored in more detail in the pages that follow.

TABLE F.1

Key Elements and Benefits of Doughnut Economies

Key Elements	Key Benefits
▪ Ecological sustainability and regeneration ▪ Social equity and redistribution ▪ Cooperation and interdependence	▪ Economic sustainability and resilience ▪ Addressing climate change and healing ecological systems ▪ Health and healthy environments ▪ Social equity

Source: Urban Institute analysis

BOX F.1

Advancing a Doughnut Economy in the Central San Joaquin Valley

The Doughnut Economics framework is highly aligned with all three CERF goals of economic health, climate action, and equity. The framework asserts that economies must simultaneously prioritize the social wellbeing of all people and the health of the planet. While there is evidence of the benefits of practices theoretically aligned with the Doughnut Economics framework (for example, see Triple Bottom Line) given the relative newness of the Doughnut Economics framework itself, most of its benefits remain promising more than proven at this point in time.

Adoption of the framework also remains relatively low—while some cities have embraced Doughnut Economics, the framework has yet to gain traction at the national or international levels. In California, some community groups have begun organizing around the principles of Doughnut Economics, including the California Doughnut Economic Coalition and the California Wellbeing Economy Alliance, but it has not yet been adopted widely.

Effectively transitioning to a Doughnut Economy will likely require a robust policy response, beginning with adopting alternative measures of economic performance, incorporating goals and metrics for measuring wellbeing, and appropriately accounting for social and environmental externalities. Policies supporting cooperation and interdependence, such as policies incentivizing the growth or creation of cooperatively-owned businesses, are also likely to be critical in catalyzing the

transition. Beyond advocating for these policies, there are several other opportunities that the Valley CERF coalition could pursue to advance a Doughnut Economy in the region, including making strategic investments in industries like clean energy and responsible food systems that can help meet basic needs and contribute to economic health and climate action, and partnering with existing coalitions to accelerate the pace of change.

Key Elements

The key elements of the Doughnut Economics framework can be synthesized into the following (Raworth 2017):

Ecological sustainability and regeneration

Ecological sustainability and regeneration of ecological systems are key elements of Doughnut Economics. The framework recognizes that there are certain ecological ceilings we must stay within in order to avoid overshooting the planetary boundaries that support life on earth. These boundaries include climate change, air pollution, and biodiversity loss, along with six others (see Figure F.1) that together regulate the stability and resilience of our planet. Because human activity has led to us transgressing six of the nine planetary boundaries (Richardson et al. 2023), the Doughnut Economics framework prioritizes the adoption of ecologically sustainable practices as well as active regeneration of the earth and its living systems to ensure we can get back in bounds. Doing so would entail addressing climate change and working toward carbon neutrality, reducing air and chemical pollution; reversing ocean acidification and biodiversity loss; along with other actions that would restore and sustain our natural systems in a healthy state.

Social equity and redistribution

Social equity is another key element of Doughnut Economics, as depicted by the inner ring of the social foundation. The ultimate goal of the Doughnut Economics framework is for our economy to "meet the needs of all people within the means of the planet."[247] The framework suggests that basic needs should include food, water, energy, and housing, as well as education and political inclusion. Raworth suggests that a primary reason for inequity is the inequitable distribution of resources rather than a shortage of resources needed to meet the needs of all people on the planet.[248] Thus, a core solution that the framework promotes is redistribution of wealth, political power, and resources, in addition to other systems changes.

Cooperation and interdependence

The Doughnut Economic framework also highlights the complexities of and interdependencies between societies, their economies, and ecological systems. It emphasizes the need to recognize that "the economy is embedded within, and dependent upon, society and the living world."[249] As a result, the framework prioritizes systems thinking and nurturing cooperative (instead of competitive) behavior, both of which can help ensure that we are all able to thrive on a healthy planet.

Benefits

The Doughnut Economics framework provides a well-researched argument that challenges the widely accepted notion that economic growth is a necessary precondition for equity and environmental health, offering instead an alternative economic mindset where the goal is to "thrive within the doughnut."[250] While there is evidence of the benefits of practices theoretically aligned with the Doughnut Economics framework (for example, see Triple Bottom Line), given the relative newness of the Doughnut Economics framework itself and the limited examples of comprehensive adoption to date, most of its benefits remain promising more than proven at this point in time. However, the CERF goals of economic health, climate action, and equity, are well-aligned with the goal of Doughnut Economics. Thriving within the doughnut requires a minimum standard of social welfare—which includes dimensions of equity and economic health—as well as protecting and restoring our natural systems, which includes addressing and reversing climate change. Some of these goals—which are also expected benefits of the framework—are outlined below.

ECONOMIC HEALTH, COMPETITIVENESS, AND RESILIENCE

- **Economic sustainability and resilience.** The starting point of Doughnut Economics is to change the goal from endless economic growth to thriving within the doughnut (Raworth 2017). Thus, Doughnut Economies are designed to be regenerative and redistributive, and may help create more sustainable and resilient economies by emphasizing the interdependence of healthy economies and healthy ecological systems.

CLIMATE AND ENVIRONMENTAL

- **Addressing climate change and healing ecological systems.** Doughnut Economics highlights nine planetary boundaries that climate scientists say we must not overshoot to protect our planet's natural systems, one of which is climate change. Thriving within the doughnut thus

requires actions that keep us within the ecologically safe space, or, in cases where we have already overshot, bring us back to safer spaces. These include addressing climate change, reducing air pollution, and stopping biodiversity loss and the depletion of the ozone layer. However, merely stopping the damage is not enough—we must also work to create economies and organizations that are regenerative by design and that restore our natural systems, including the land, air, and water.

- **Health and healthy environments**. Health is one of the twelve "wedges" of the social foundation and is key to meeting the needs of all people. Meeting other needs in the social foundation—such as water, food, housing, and energy, can also contribute to public health. And protecting the ecological health of the planet—including by addressing climate change and reducing pollution—will lead to healthier environments, which in turn will have positive impacts on public health.

EQUITY

- **Social equity.** Thriving within the doughnut means meeting the needs of all people, as represented by the inner ring of the doughnut (the social foundation) within the means of the planet (Raworth 2017). This foundation explicitly includes social equity, gender equality, and political voice (see Figure F.1). As a result, Doughnut Economies should be expected to foster higher levels of equity, not just in terms of income, but also wealth, knowledge, resources, democracy, and more.

Prevalence and Adoption

While the Doughnut Economics framework has gained global recognition in the last decade, it is nonetheless still a relatively new concept. As a result, adoption of the framework remains relatively low; of the places where it has been adopted, efforts have been led by engaged community groups as well as local governments.

GLOBAL

Although the Doughnut Economics framework is still an emerging model, there is increasing global recognition of the interdependencies between the health and wellbeing of people, the planet, and the economy. For instance, the United Nations Sustainable Development Goals, adopted in 2015, include strategies related to all three areas, such as climate action, supporting quality jobs, and achieving good health and wellbeing for all.[251]

In 2015, Wales passed a "Well-being of Future Generations Act," that, while not explicitly tied to Doughnut Economics, articulates many of the same principles. As described, the act gives Wales "the ambition, permission, and legal obligation to improve [their] social, cultural, environmental and economic well-being," and establishes seven wellbeing goals that the government must work towards.[252] In 2018, the Wellbeing Economy Alliance was founded to catalyze a global transition towards a Wellbeing Economy, defined as "an economy designed to serve people and the planet, not the other way around."[253]

In March 2020, the European Commission hosted a 2-day workshop to explore how the Doughnut Economics framework could be used in the context of European Union member nations, and later that year announced that it had begun "experimenting" with Doughnut Economics.[254] There are also coalitions of residents and community organizations organizing around Doughnut Economics in many cities, from Paris to Munich to Sydney. Some European cities have formally adopted the doughnut framework. Amsterdam, for example, has embraced Doughnut Economics, and is using it to guide its journey to becoming 100 percent circular—meaning that all materials are reused and no waste is produced—by 2050.[255] The framework has also been adopted by cities such as Copenhagen, Brussels, and Nanaimo in British Columbia.[256]

NATIONAL

In the US, the cities of Portland, Oregon and Philadelphia, Pennsylvania participated in the Thriving Cities Initiative beginning in 2019 (see Box F.2 for more detail on Portland's participation). The initiative aimed to pilot new tools to "foster collaborative action towards socially-just and ecologically-safe cities." As part of the initiative, the Doughnut Economics Action Lab produced "city doughnut" portraits for each participating city, providing holistic snapshots of the city through four lenses: social, ecological, local, and global.[257] Outside of government, networks such as the Vermont Prosperity Project are also working to advance Doughnut Economies locally and regionally.

REGIONAL/LOCAL

The California Doughnut Economics Coalition was founded in 2020 to "initiate regenerative and distributive economic systems throughout California."[258] It does so by raising awareness of the Doughnut Economics framework, collaborating with aligned organizations and changemakers to amplify their work, and providing support to doughnut-relevant initiatives and policy changes. The Wellbeing Economy Alliance also established a California hub to work towards a "harmonious, just, and regenerative economy that allows all Californians to thrive."[259] In 2021, it launched its first local Wellbeing Economy project in the city of Pomona, where it is engaging Pomona residents,

collaborating with city leaders to implement policies that put wellbeing first, and launching a community wealth-building project to improve the material wellbeing of low-income residents.[260]

BOX F.2

Example: Portland, Oregon's Exploration of Doughnut Economics

As noted, the city of Portland, Oregon was one of three cities worldwide that participated in a pilot program to explore the Doughnut Economics framework in its local context. The program, called the Thriving Cities Initiative, launched in 2019, and was led by the Doughnut Economics Action Lab in collaboration with C40 Cities and the Circle Economy. In the first phase of the program, the Doughnut Economics Action Lab created a City Portrait for Portland to examine its current state through four lenses: social, ecological, local, and global.[261] A workshop was then conducted for stakeholders across nearly 20 city and county departments and offices to explore the portrait, identify drivers and root causes behind the city's problems, and begin to form a vision for a thriving Portland.[262] The participants identified six deep drivers, including capitalism, social inequity, disconnects between people and nature, and a lack of prioritization of basic needs.[263]

A second workshop was held to explore how Portland could integrate the Doughnut Economics framework into its work to support a green and just recovery from the pandemic. This workshop surfaced four main themes: targeted, equity-focused support for communities that are most vulnerable, including BIPOC communities; supporting green, local businesses that can boost the local economy while reducing environmental damage created by globalized supply chains; fostering cross-bureau collaboration and participatory governance with communities and businesses; and designing citywide performance measurements that reflect the holistic nature of Portland's challenges.[264] However, the second and third phases of the program—which involved identifying local initiatives and global best practices and establishing partnerships and creating pathways to action—were delayed due to the COVID-19 pandemic, and the pilot program has since been discontinued.

A representative from the city of Portland who participated in the pilot reflected that it was difficult to get buy-in from other departments, in part because of a lack of willingness to experiment in the face of multiple, intersecting crises, and in part because of a sense that the framework was being imposed on them. Despite this difficulty, the end of the pilot program did not mark the end of Portland's engagement with Doughnut Economics. In 2021, Portland's Bureau of Planning and Sustainability published a Sustainable Consumption and Production Report, informed in large part by the Doughnut Economics framework. The report explores how the city can "shift measure[s] of success away from traditional models of economic growth to measurements of equitable consumption and well-being, all while acknowledging and dismantling historic injustice and oppression," and outlines strategies to not only reduce emissions, but also advance equity and improve community resilience and wellbeing (Portland Bureau of Planning and Sustainability 2021).

The report contains proposed actions across four key categories (food and beverage, goods and services, construction and land use, and economic progress) including strategies such as preventing food waste; increasing participation in reuse, repair, and sharing services; reducing community exposure to toxins; increasing the use of building materials with low embodied carbon; increasing density and the availability of smaller housing units; and shifting how economic progress is defined to better reflect community resilience, wellbeing, and environmental health.

Opportunities and Considerations

The Doughnut Economics framework offers a comprehensive lens that the Valley CERF coalition can use to consider pathways to addressing the intersecting challenges of persistent poverty, inequality, and intensifying environmental pressures in the Central San Joaquin Valley. This creates a broad menu of possibilities; some opportunities that the Valley CERF coalition can consider pursuing include developing industries that can not only help meet basic needs, but also contribute to economic justice and climate action; supporting the redesign of businesses in key industries; and partnering with existing coalitions to advocate for a statewide economy that prioritizes the wellbeing of both people and the planet. However, because the framework remains relatively new and untested, specific solutions will need to be generated locally in consultation with community members and other stakeholders.

OPPORTUNITIES

- Developing industries that can not only help meet basic needs in the social foundation, but also contribute to economic health and resilience, environmental justice, and climate action. These might include industries such as clean energy and responsible food systems, which meet critical food and energy needs while also supporting quality local jobs that provide family-supporting wages and reducing greenhouse gas emissions and pollution. The Valley CERF coalition may be able to leverage new federal funding, including through the Inflation Reduction Act and the Infrastructure Investment and Jobs Act, to grow these and similar industries (see Blount et al. 2023 for more information on relevant funding programs).
- Supporting the redesign of businesses to become regenerative and distributive.[265] This could include, for example, shifting to regenerative farming practices like cover cropping that help restore soil health; employing circular manufacturing practices that minimize the need for extracting non-renewable raw materials and lead to more reuse and repair; and shifting to

ownership structures such as benefit corporations or worker-owned cooperatives that are proven to better enable the types of business practices the Doughnut framework espouses.

- Partnering with existing coalitions, including the California Doughnut Economics Coalition and the California Wellbeing Economy Alliance, to advocate for a regional and statewide economy that prioritizes the wellbeing of the people and planet. The Valley CERF coalition can also leverage resources provided by these groups and engage in opportunities to convene with others working towards similar goals.

CONSIDERATIONS

The Doughnut Economics framework remains relatively new and untested—while some cities have begun applying the framework, it is too early to point to success stories or measurable outcomes. Additionally, while the Doughnut Economics Action Lab offers many tools in support of turning the principles of Doughnut Economics into action, specific solutions will look different for each place and will need to be generated locally.

Policies and Other Levers

Transitioning to a Doughnut Economy will require creating an environment that allows for the prioritization of goals other than economic growth, as well as removing barriers that stand in the way of organizations and individuals working toward an ecologically responsible and equitable economy.

ENABLING

- **Educating the public and decisionmakers.** Raising awareness about Doughnut Economics and its benefits can help catalyze a shift in thinking about the intersection of the economy, society, and the environment, and may help lead to an emphasis on wellbeing and sustainability.
- **Establishing alternate measurements of economic performance.** Reframing the dominant narrative towards holistic wellbeing requires creating alternative measures of economic performance that account for social and environmental externalities. Doing so can help shift conversations and actions towards social and environmental wellbeing and ensure that decisionmakers prioritize these outcomes in addition to economic prosperity. Examples of alternative measurements that have been adopted by some governments include the Human Development Index and the Genuine Progress Index.[266]

- **Creating comprehensive plans.** To move towards thriving within the doughnut, local and regional governments must create evidence-informed comprehensive plans that explicitly chart paths towards meeting needs in the social foundation while not surpassing the ecological ceiling. These plans can help coordinate action between different departments and different levels of government, and ensure that social equity and climate action are prioritized alongside economic development.
- **Activating and supporting the private sector and business community.** The size and scale of the private sector makes it an important stakeholder group in advancing the goals of the Doughnut Economics framework. Local and regional governments have many tools at their disposal to encourage and incentivize businesses to embody regenerative and distributive goals. These include taxation powers, procurement policies, business regulations, and financing and start-up support. Leveraging combinations of these tools can help grow businesses that prioritize social, environmental, and economic goals.[267] For instance, Philadelphia began a shift from contracting by lowest bid to contracting by best value in 2017, which enables the city to include social and environmental considerations when selecting vendors to procure from.[268]
- **Supporting local and cooperative businesses.** Local and cooperatively-owned businesses are well-aligned with many Doughnut Economics principles—local businesses can not only provide high-quality, living-wage jobs, they also contribute to environmental sustainability and self-reliance. Similarly, cooperative businesses not only contribute to local economic resilience and prosperity, they also prioritize the social, economic, and environmental sustainability of their communities.[269] Supporting the growth of these business models—including through preferential tax and procurement policies—can help build wealth and power in historically marginalized communities, dismantle structural racism and other forms of oppression, and facilitate healing and repair for both people and the planet.
- **Fostering and resourcing networks.** In addition to the above, movement leaders suggested that local and regional actors—both governmental and non-governmental—can create and support networks and backbone organizations that bring together the many stakeholders and organizations already doing work in similar fields to build trust and relationships, as well as facilitating action-oriented conversations about how to achieve the transformation necessary to thrive within the doughnut.

CONSTRAINING

- **Entrenched ideologies**. Movement leaders noted that many societies have entrenched economic growth as the ultimate goal for decades if not centuries. Moving away from that paradigm towards a more sustainable economy that also prioritizes social and ecological impacts will likely require a society-wide shift in thinking around economic growth and prosperity.
- **Entrenched mechanisms that don't account for externalities**. Our current economic model encourages competition on the basis of price, which means those who are able to provide goods or services at the lowest price are at an advantage over those who choose to take on additional costs, such as paying living wages. These entrenched pricing incentives fail to account for social and environmental externalities, such as the pollution and waste generated by extractive practices and the social costs of paying workers low wages. Without mechanisms to account for those externalities, whether regulation, taxes, or other policies, our economy will continue to favor extractive practices instead of regenerative ones.

Industry Clusters

In this section, we introduce and summarize the level of proven and promising evidence regarding four industry clusters to assess their potential to advance CERF's goals of economic competitiveness and resilience, equity, and climate action in the Central San Joaquin Valley, California. A summary is provided for each of the following:

- G) Clean Energy
- H) Responsible Food Systems
- I) One Water Management
- J) Circular Manufacturing

For each industry cluster, we include the definition, as well as a summary of key elements or principles; associated benefits; prevalence globally, nationally and locally; opportunities and considerations for application in the Central San Joaquin Valley; and policies and other levers that can support adoption.

The appendix includes a quantitative assessment of the size and scale of the clean energy, food, water, and manufacturing industries in the Central San Joaquin Valley today. For each industry cluster we identify relevant industry sectors, estimate the number of relevant employees and businesses within the region, assess the size of businesses within each sector, and estimate annual wages. Data and other limitations for each industry cluster vary and are described with each subsection.

Clean Energy

Clean energy encompasses energy that comes from zero emission and renewable sources that, when used, do not pollute the atmosphere, as well as energy efficiency measures that save energy (IEA 2023).

The clean energy industry can be broken down into six different employment sectors: renewable energy, energy efficiency, clean vehicles, transmission and distribution, storage, and grid modernization. (E2 2023).[270] Definitions for each clean energy sector are summarized in Table G.1.

TABLE G.1

Clean Energy Sectors

Sectors	Definition
Renewable Energy	Renewable energy is produced from sources that are naturally replenished and on a timescale that aligns with the rate of use; renewable energy sources include the sun and wind. Non-renewable energy, in contrast, is produced from sources that are not naturally replenished, or not at the timescale that aligns with rates of use, and so can be depleted; non-renewable energy sources include fossil fuels like coal, oil, and natural gas. Renewable energy can be used for the same things non-renewable energy is used for, such as electricity generation, heating and cooling, and transportation.
Energy Efficiency	Energy efficiency includes the design, production, wholesale trade, installation, and repair and maintenance of products that increase energy efficiency and the provision of services that reduce energy consumption related to buildings (DOE 2023).
Clean Vehicles	A "clean vehicle" is one that isn't powered by fossil fuels or one that uses less fossil fuels. Battery electric vehicles, plug-in hybrid, hybrid electric, and hydrogen and fuel cells are all examples of clean vehicles (DOE 2023). The clean vehicles sector includes the designing, manufacturing, shipping, and repairing of clean vehicles.
Transmission and Distribution	Transmission refers to transferring electricity from the generators to municipalities. From there, the voltage is decreased, and the energy is distributed to individual households, businesses, and other end users for consumption.[271]

Storage	The electricity grid is based on balancing power supply and demand. When energy supply is higher than demand, storage mechanisms are needed to store the excess energy for future uses. When demand is greater than supply, the stored energy can be released to the grid for consumption.[272] Storage systems include batteries, pumped hydroelectric storage, mechanical storage (flywheels, compressed air energy storage), and thermal storage (UDOE 2023).
Grid Modernization	The U.S. electric grid, or "the grid," connects businesses and homes to a network of transmission lines that distribute power.[273] Grid modernization works to expand storage capacity while enhancing the electric grid's efficiency, resilience, and adaptability. This includes making the grid "smarter" by integrating technologies that can detect and react to changes in electricity use. The microgrid refers to a group of transmission and distribution lines, contained within a defined electrical boundary, that act as an independently controllable entity (DOE 2023).

Source: Urban Institute analysis

Table G.2 includes a summary of the key elements and benefits of Clean Energy and Box G.1 summarizes key opportunities and considerations, all of which are explored in more detail in the pages that follow.

TABLE G.2

Key Elements and Benefits of Clean Energy

Key Elements	Key Benefits
▪ Renewability ▪ Efficiency ▪ Resilience	▪ Jobs and quality jobs ▪ Economic opportunities for small businesses ▪ Emissions reductions ▪ Air and water quality protections ▪ Climate resilience

Source: Urban Institute analysis

BOX G.1

Advancing Clean Energy in the Central San Joaquin Valley

The opportunity for Valley CERF to invest in clean energy is grounded in several factors, including existing infrastructure, supportive state and federal policies providing investments in clean energy expansions, and evidence forecasting the growth of the clean energy industry. Additionally, evidence

shows that investing in clean energy could result in job growth, economic opportunities for small businesses, and positive climate and environmental outcomes, which are aligned with CERF goals.

Scientific consensus is that there is an immediate need to transition to a fully clean energy economy and divest from the production of fossil fuels in order to slow the rate of climate change. With the increased prevalence of extreme weather events and prolonged droughts already occurring, measures must also be taken to fortify the energy system to become more prepared for adapting to and responding to climate disasters. An unprecedented amount of federal and state funding is flowing into clean energy, which creates a significant opportunity for regions like the Central San Joaquin Valley to leverage those funds for economic development.[274]

To do so, the Central San Joaquin Valley can consider how it can not only support the region to transition to a clean energy economy, but also to invest in a clean energy industry cluster that could design, develop, and deploy renewable energy and energy efficiency technologies, grid modernization technologies, and clean vehicle technologies—in and for the region as well as to export throughout the state and the rest of the US. In tandem with the growth of a clean energy industry cluster, it will be important for the Valley CERF region to ensure its benefits for workers, businesses, communities, and the regional economy are shared equitably.

Key Elements

There is international scientific consensus that greenhouse gas (GHG) emissions must be aggressively reduced to avoid further harmful impacts of climate change. According to the Intergovernmental Panel on Climate Change, rising global temperatures can be attributed to increases in greenhouse gases resulting from human activity, including the burning of fossil fuels (IPCC 2023). Thus, to reduce greenhouse gas emissions, a complete transition to clean energy is imperative.

Clean energy responds to the rising threat of climate change with three key elements: investment in renewables, increasing energy efficiency, and developing resilience.

Investments in renewables

As noted above, renewable energy is produced from sources that are naturally replenished and on a timescale that aligns with the rate of use; renewable energy sources include solar, wind, biomass, biofuels, hydroelectric, and geothermal.[275] Renewable energy can be used for many purposes, including electricity generation, heating and cooling of spaces and water, and transportation.[276] Switching to renewable energy production – especially when paired with divesting from coal and other fossil fuels—will lead to a drastic decrease in GHG emissions (US DOS 2021).

Increasing in energy efficiency

To successfully transition to only renewable energy sources, everything must be electrified. Increased electrification means increased demand on the grid. Even with grid modernization, energy efficiency upgrades are needed to lower peak loads and decrease overall reliance on the grid.[277] Actions such as retrofitting homes, adopting energy efficient building codes, and investing in energy efficient appliances will all lead to a more energy efficient society (US DOS 2021).

Developing resilience

Increasingly frequent and severe natural disasters resulting from climate change necessitate steps to ensure the resilience of the clean energy industry and energy infrastructure.[278] Grid modernizations support greater resilience by allowing for the integration and large scale deployment of renewable energy sources, implementation of technologies that will help detect and react to changes in energy demand, and the adoption of more reliable storage systems.[279] Grid infrastructure can be fortified by building transmission and distribution lines underground, instead of building them above ground, which can help shield them from the impacts of climate change-related disasters.[280] Technologies such as digital meters, automated feeder switches, and high-capacity batteries all improve the grid's ability to respond to changes in demand and power outages.[281]

Benefits

The benefits of the clean energy industry cluster, some of which are outlined below, align with CERF goals around economic health, competitiveness, and resilience; equity; and climate action. There is strong evidence that a clean energy industry cluster would create jobs, opportunities for small businesses, and mitigate the effects of climate change, among other benefits. However, efforts are needed to ensure the benefits of clean energy and a clean energy industry cluster are shared equitably.

ECONOMIC HEALTH, COMPETITIVENESS, AND RESILIENCE

Clean energy is seeing steady growth, and provides operational stability to businesses and shows signs of economic resilience (DOE 2023). With the necessary and accelerating shift towards clean energy, there are also increasing opportunities for employment.

- **Jobs and quality jobs.** A clean energy industry cluster offers new and rapidly growing employment opportunities. In 2022, 1 in 30 net new jobs were in clean energy. Clean energy jobs have grown by 10% over the past two years, a rate faster than the overall growth in US

employment (E2 2023), and in contrast with trends in the fossil fuel industry. For example, in 2021, approximately 156,000 jobs were added across clean energy sectors, in contrast to a 35,000 reduction in jobs within the fossil fuel industry (E2 2022).

Not only are clean energy jobs growing, but they also support a wide range of employees with various technical backgrounds and don't always require a college degree. For example, in 2022, almost half of clean energy jobs fell under construction, followed by professional services (22.8%) and manufacturing (14.3%) (E2 2023). Overall, median hourly wages for clean energy jobs are nearly 25 percent higher than the national median wage. Moreover, compared to jobs across the private sector, clean energy jobs are more likely to come with health care and retirement benefits (E2 2020). Clean energy jobs also have higher rates of unionization across all sectors (11 percent), as compared to unionization rate across the rest of the private sector (7 percent) (DOE2023). Unionization has been shown to have a positive impact the economy and worker's well-being by decreasing wage inequality, strengthening the safety of the workplace, and increasing employee benefits such as paid time off, health insurance, and retirement.[282] Additionally, according to a clean energy expert interviewed, jobs related to energy efficiency in particular, tend to be local and permanent.

Further, within 2 years of the job losses across the economy due to COVID-19 that began in March 2020, 75 percent of clean energy jobs were regained, indicating that a clean energy industry cluster might be resilient in the face of economic downturns, supporting stability for workers and businesses.

- **Economic Opportunities for Small Businesses.** Small businesses currently support most clean energy jobs, pointing to small businesses being both key beneficiaries of and key contributors to the growth of clean energy. For example, in 2022, 90 percent of all clean energy jobs were with companies that employed fewer than 100 people, and 64 percent of clean energy jobs were with companies that employed fewer than 20 people (E2 2022). Underscoring the importance of small businesses to the stability of an industry and economy overall, the SBA notes that small businesses have provided 2 out of every 3 jobs over the last 25 years (SBA 2022); this includes the years of the Great Recession and the economic downturn caused by the COVID-19 pandemic.

CLIMATE AND ENVIRONMENTAL

- **Reduction in emissions.** The transportation sector is currently the largest generator of greenhouse gas (GHG) emissions in the US, contributing 28 percent of the total emissions. Electricity production, nearly 80 percent of which is still generated from fossil fuels,

contributes 25 percent of U.S. GHG; industry, such as manufacturing, contributes 23 percent; commercial and residential use contributes 13 percent; and agriculture contributes 10 percent. [283] While emissions from agriculture are noted to be a low percent of the overall total of GHG emissions, agricultural emissions are primarily methane, a GHG nearly 30 times more potent than carbon dioxide.[284] Thus, transitioning to clean energy across transportation, electricity production, industry, commercial and residential use, and agriculture directly reduces greenhouse gas emissions, and helps mitigate further climate change.

- **Protecting air and water quality through renewables.** Within the renewable energy sector, wind and solar are favored, in part because they emit the lowest volume of greenhouse gases.[285] Additionally, solar and wind power require very little water to operate the facilities, whereas fossil fuels, specifically coal mining and natural gas drilling, pollute nearby water sources with operations and rely on water for cooling.[286]

  Increasing renewable energy sources, especially when paired with divestments in fossil fuel sources, will also improve air quality. A study conducted by the American Lung Association found that a shift to zero-emissions trucking coupled with an increasingly clean, non-combustion energy mix will avoid 66,800 premature deaths, 1.75 million asthma attacks, 8.5 million lost workdays, and will have an overall public health benefit value of $735 billion (American Lung Association 2022).

- **Building climate resilience.** Climate change is expected to create more frequent and severe disasters in the future, which risk energy generation and distribution.[287] Protecting transmission lines can minimize their exposure to disasters, while modernizing the grid and storage capacities can help minimize the impact of disasters when they occur. Acknowledging this, the Department of Energy founded the Grid Modernization Initiative to improve grid architecture and advance grid technology to better deliver resilient, reliable, flexible and sustainable electricity.[288]

EQUITY

As clean energy implementation expands, it is imperative to take steps to ensure its benefits are shared equitably. Prioritizing a just transition, inclusive of workers, business owners, communities, and other stakeholders, is essential in clean energy policy, programming, and other efforts. With intentional planning, clean energy can support small businesses, specifically those that are BIPOC owned, to generate wealth and create healthier communities.[289] Additionally, clean energy is shown to produce well-paying jobs with quality health benefits, but strides need to be taken to ensure that the job opportunities, as well as products, services, and technologies are equitably accessible to

marginalized people and communities. Researchers have cited opportunities to enhance equity within the clean energy industry cluster, including by:

- Prioritizing community engagement when designing clean energy policy and allowing historically disinvested communities to drive the decisions (ACEEE 2023).
- Diversifying the clean energy workforce in terms of race gender, and technical background, by increasing job training opportunities and expanding outreach.[290]
- Subsidizing clean energy initiatives such as retrofitting homes to increase energy efficiency and transitioning to renewable energy, for households that are economically vulnerable.[291]

Prevalence and Adoption

Historic investments in clean energy are being made at the global, national, and state scales to build resilience in the face of climate change, create quality jobs, and support the transition to a more sustainable economy.

GLOBAL

Globally, investments in clean energy are on the rise. By 2025, renewables are projected to become the largest source of global electricity generation, surpassing coal (IEA 2022). Solar capacity is expected to triple by 2027, which will make solar the leader in renewable capacity out of all renewable energy subsectors (IEA 2022). These trends are reflected in investment as well; international public finance for the production of fossil fuels has significantly decreased, whereas investments in clean energy have grown over the past years, despite the pandemic (UNEP 2021) Further, the invasion of Ukraine by Russia brought energy security to the forefront of global discourse, underscoring the importance of countries investing in domestic renewable energy generation (IEA 2022). Networks like C40 exist to unite city leaders on a global scale and mobilize climate action, however, current global efforts have lacked the urgency and discipline needed to meet necessary fossil fuel reduction goals.[292]

NATIONAL

As of 2022, clean energy jobs accounted for than 40% of all energy jobs and this percentage is only expected to increase (DOE 2023). In 2022, there were 3.3 million Americans working in clean energy, which represents an increase of more than 114,000 jobs since 2021, or growth of 3.9 percent. This is comparable to the 4.2 percent increase in annual average hire rates between 2021 to 2022 in the US.[293] Among the clean energy jobs, solar added the most, contributing 12,256 jobs in 2022 (DOE 2023). The federal government has made historic investments in clean energy because of the proven

economic and environmental benefits. Under the Infrastructure Investment and Jobs Act and the Inflation Reduction Act, hundreds of billions of dollars have been poured into clean energy.[294] [295] State and local governments are also supporting the clean energy movement through initiatives such as the United States Climate Alliance, a collation of 25 governors committed to a net-zero future.[296] And Climate Mayors, a bipartisan network founded in 2014 representing mayors in 48 states and 60 million Americans, are taking steps in support of climate action.[297]

REGIONAL/LOCAL

Numerous efforts have been made at the state level in California to combat the impacts of climate change. The passage of The 100 Percent Clean Energy Act of 2018 established state goals to source 60% of their electricity from clean energy by 2030, and 100% by 2045.[298] And, in 2019, the Innovative Clean Transit (ICT) regulation was passed and requires all California public transit agencies gradually transition their fleets to zero-emission technologies. The goal of reaching a clean energy fleet is set for 2040, however, beginning in 2029, 100 percent of the new bus purchased must be zero-emission buses.[299]

Within the Central San Joaquin Valley, the largest number of clean energy related jobs are in the energy efficiency sector according to an analysis of the 2023 U.S. Energy and Employment Report (E2 2023). Energy efficiency jobs include the installation of energy efficient upgrades in homes and buildings as well as the design and manufacture of affordable energy efficient products and technologies. Following energy efficiency, the largest number of clean energy jobs are in renewable generation (3,110 jobs) and clean vehicles (2,551 jobs) (see Appendix **Error! Reference source not found.**).[300]

Organizations located in the Central San Joaquin Valley offer job trainings to prepare the workforce for the market demand for clean energy jobs, specifically solar. Organizations such as Rising Sun: Center for Opportunity and Central Valley GRID Alternatives provide internship programs that teach and certify adults and young adults how to install and maintain solar panels. Some also offer guidance in finding job placements after the program is complete.[301]

Opportunities and Considerations

Significant federal policy and investments, state policy and investments, market trends, and current regional assets all point to opportunity to develop a clean energy industry cluster in the Central San Joaquin Valley which can lead to job creation, a healthier environment, business stability, and – with intention—enhance equity.

OPPORTUNITIES

- **Remain a key player in meeting California's renewable energy goals through solar.** The geographical location of the Central San Joaquin Valley is an ideal place to install solar farms, given its vast amounts of open land and average of 3,200 hours of sunlight annually.[302] Currently, the Central San Joaquin Valley is responsible for providing 25 percent of California's solar energy despite being only 10 percent of the state's total land area.[303] The region can continue to play an integral part moving forward in the state's plans to reach carbon neutrality by 2045.[304]

  Further, due to drought in the Central San Joaquin Valley, an estimated one million acres of farmland could go out of production soon (CVCF 2023). This retired farmland could be transformed into solar farms to increase the production of renewable energy and provide needed replacement revenue for farmers. For farmland that isn't being retired, agrivoltaics, or the practice of using the same land for both solar panels and agriculture, including by farming underneath or between rows of solar panels, could be considered. [305] [306] [307] [308] In 2016, California's Governor's office, along with University of California Berkely and the Conservation Biology Institute (CBI), generated a report identifying the "least-conflict" lands for solar projects in the Central San Joaquin Valley. The identified areas are suitable for solar projects and the least contested by stakeholders, which will hopefully streamline the application process for solar projects. The report identified over 470,000 acres of least-conflict land (Pearce, 2016), and can be used in the planning process for the Central San Joaquin Valley.

- **Invest in biomass.** Due to the large presence of agriculture in the Central San Joaquin Valley, there is an opportunity to develop a biomass industry cluster that can be fueled by agriculture waste, animal manure, wood, and other excess organic materials. Biomass can be burned directly for heat or converted to liquid and gas.[309] Repurposing waste for energy generation can create a sustainable supply chain and save costs on waste management for businesses. A biomass cluster could also create job opportunities to design and build innovative biomass facilities that are specifically made to repurpose the agricultural or other organic excess generated in the Central San Joaquin Valley. The region can consider exporting this expertise and technology as well. Additional jobs will be created once the biomass facility is established; it is likely that there will be a significant number of jobs since the work is labor intensive.[310] If the Central San Joaquin Valley were to invest in a biomass industry cluster, the region should

consider partnering with research institutions to explore new and improved technologies that reduce the negative environmental impacts of burning biomass,[311] as well as consider ways to minimize diverting farmland from food to fuel.

CONSIDERATIONS

- **Diversity in employment.** Currently, 24% of the workers in clean energy are non-white, which is slightly hirer than the national average for the entire workforce (23%), however efforts are needed to further diversify the industry (E2 2022). The clean energy industry also disproportionately employs men; women made up just 26% of the energy workforce, compared to 47% of the overall workforce. (E2 2022). The Central San Joaquin Valley can set goals to hire men and women workers at equal rates and ensure that the workforce is representative of the community by actively recruiting people of color.
- **A Just Transition.** Historically, communities who are the least responsible for climate change are overburdened with excess exposure to harmful pollution as well as being more likely to be disproportionately burdened by the cost of energy (spending a higher percentage of their income on energy).[312] With the development of a clean energy industry cluster, there is opportunity to place an emphasis on prioritizing marginalized workers, business owners, and communities. For example, as more homes transition from fossil fuel energy sources to renewable energy sources, the cost of maintaining the coal and gas infrastructure will grow per consumer as fewer people rely on it. Thus, marginalized communities need to be the first to transition to renewable energy so that they don't experience the soaring cost of traditional energy that will be brought on by the divestment from fossil fuel infrastructure (ACEEE 2023). Policymakers and advocates of the transition to clean energy need to ensure that the clean energy is both affordable and accessible to communities with lower capital.
- **Developing the Region's Unique Market Contribution.** In an interview with an expert on developing clean energy jobs, key factors were identified to help develop a successful clean energy cluster in a region. Although the Central San Joaquin Valley is well positioned for solar production and distribution, the interviewer warned that the market for manufacturing solar panels may already be saturated, so it could be wise for the region to think about its unique corner of the market, such as the design and manufacture of other products and technologies that support clean energy like biomass, agrivoltaics and other solar technologies, energy efficiency, grid modernization, storage, and clean vehicles – including retrofitting fossil fuel vehicles.

Policies and Other Levers

Policy, especially at the federal and state levels, are major drivers for clean energy, and there are currently a number of existing federal and state laws catalyzing increasing investments in clean energy. Programmatic levers are also important drivers, especially if local economic benefits and equity goals are to be achieved.

ENABLING

- **Federal policy and federal funding.** In 2021, the Federal government passed the bipartisan Infrastructure Investment and Jobs Act (IIJA),[313] which creates funding for new programs and expands existing programs, including for clean energy. For example, IIJA sets aside funding for the innovation of clean energy technologies, invests $3.5 billion in the Weatherization Assistance Program to increase energy efficiency in low-income households, and provides $11 billion in grants for states to enhance the resilience of their clean energy infrastructure.[314]

  The Inflation Reduction Act (IRA), passed in 2022, invests $370 billion in clean energy and other climate action over 10 years. The IRA expands and creates programs aimed at decarbonizing buildings, including providing financial incentives to consumers to install more efficient and less polluting technologies (US Energy & Employment Report 2023). This law is estimated to add 74,181 new jobs to the US workforce.[315]

  Across all new clean energy, housing, and workforce training investments, the Federal government has also made it a goal that 40 percent of the overall benefits will go directly towards disadvantaged communities that are underserved and overburdened by pollution.[316] Given the disparities in the Valley CERF region, many communities would likely qualify as Justice40-eligible, which can be leveraged when applying for clean energy-related federal funding.

- **State policy and state funding.** With funds from the IRA, California created the Community Energy Resilience Investment (CERI) Program, aimed at strengthening the resilience of the state's grid to reduce power outages and create good-paying jobs.[317] California has also passed new building codes, effective January 2023, to incentivize developing and retrofitting homes with insulation, efficient heating and cooling systems, and efficient windows. By providing compliance credits and penalties based on the energy efficiency and carbon footprint of the building, policymakers hope the flexibility in design will give time to developers to adjust their workforce as they switch their practices.[318]

- **Partnerships with and funding for non-profits and community-based organizations.** Community-based organizations and other non-profits play an important role in equitably advancing clean energy, including by supporting the implementation of residential and commercial renewable energy and energy efficiency education and adoption programs and advocating on behalf of the communities they serve. Partnering with these organizations, and funding their work, will be important in scaling implementation efforts and ensuring that clean energy remains affordable and accessible to people and businesses in low-income communities.
- **Offering technical assistance and planning for businesses in the region.** As funding flows from federal and state policies, technical assistance and supportive planning could be useful for local businesses, especially those that are minority-owned. Developing the capacity of local clean energy experts to support the region's other businesses to assess how they can embrace renewable energy and energy efficiency in a way that is economically feasible can support local economic benefits of a local cluster.
- **Community solar practices.** Clean energy supports several shared ownership models, including community solar, which enables people to rent or own solar panels within a solar farm at an affordable rate. Given that only 31% of solar adopters currently come from households that earned less than the area median income, community solar presents an opportunity to expand access to solar for low-income households (DOE 2021). Community solar projects can also be organized to share solar energy among businesses, non-profits, and other commercial users. Customers receive an electric bill credit for the electricity that was generated by the panels they own or rent. The Fresno Disadvantaged Community (DAC) Solar Farm is an example of a large-scale solar farm that will serve qualifying low-income residents. It's unclear if the project has been completed but plans have its completion set for 2023, serving over 2,700 homes and saving subscribers an average of 20% on their energy bills.[319]

CONSTRAINING

- **Political polarization.** The advancement of clean energy can be stymied by political polarization, especially in areas that have historic investments in coal[320] and other fossil fuels. According to an interview with a clean energy expert, conservative states have begun rolling back the energy codes that regulate the energy efficiency of buildings; they noted that this often results in developers cutting building efficiency measures and higher energy costs for the end user due to a less efficient building. However, heavily Republican states are receiving most of the IIJA clean energy funds, showing that there remains an opportunity for bipartisan

support for growing the clean energy industry, especially if it comes with a financial incentive.[321]

- **Costs in the push towards electrification.** There have been many successful campaigns around 'electrifying everything,' including the heating and cooling of buildings and household appliances.[322] However, clean energy advocates note that although these programs help advance clean energy and reduce GHG emissions, they can be costly to implement. This necessitates significant funding as well as efforts to ensure that low-income users aren't burdened by implementation costs.

Responsible Food Systems

A responsible food system embeds socially and environmentally responsible practices throughout the food supply and value chain.

A food system, which can manifest as an industry cluster at a local or regional scale, includes food production, food processing, food distribution, food wholesale and retail, food hospitality, and food waste and recovery. A responsible food system embeds socially and environmentally responsible practices throughout the food supply and value chain, which includes producing food in a sustainable and regenerative way; improving resource efficiency in food processing; reducing emissions in food distribution; strengthening markets for wholesalers, retail, and hospitality establishments; and repurposing waste (Economy League 2019; Springman et al. 2018). Responsible food systems also engage businesses, government entities and other anchor institutions, non-profit organizations, and individual consumers to ensure healthy foods are accessible and affordable, and that food-related jobs provide family supporting wages, safe working conditions, and other elements of quality jobs for all workers throughout the food system (Economy League 2019).

Table H.1 includes a summary of the key elements and benefits of a Responsible Food System and Box H.1 summarizes key opportunities and considerations, all of which are explored in more detail in the pages that follow.

TABLE H.1

Key Elements and Benefits of a Responsible Food System

Key Elements	Key Benefits
▪ Regenerative, sustainable, and waste-reducing practices ▪ Strong local and ethical supply chains, value chains, and markets ▪ Accessible health-promoting products ▪ Fair wages and working conditions	▪ A healthy and resilient food economy ▪ Competitive products that support steady revenues and job growth ▪ Reduced greenhouse gas emissions, pollution, and waste ▪ Lower vulnerability to drought ▪ More disaster-prepared communities ▪ Fairer distribution of wages and better working conditions ▪ Health supporting food ▪ Wealth-building ownership opportunities

Source: Urban Institute analysis

BOX H.1

Advancing a Responsible Food System in the Central San Joaquin Valley

Responsible food systems show proven and promising benefits aligned with CERF goals, including reduced emissions and demands on nature all along the supply chain; creating new market opportunities; supporting quality jobs; and increasing access to healthy foods.

While we did not find comprehensive examples of responsible food systems, some municipalities in California are planning and beginning to implement food economy transitions. Components of responsible food systems are being advanced in the state including adoption of regenerative agriculture practices, support for stronger local markets, better access to healthy food, and higher-wage jobs in the food economy.

State mandates for organic waste reduction, the central role of agriculture in the regional economy, and a need to reduce demands on vulnerable land and water resources in the Valley CERF region present opportunities to develop a responsible food industry cluster in the region; food insecurity as well as a large portion of the region's population living under the poverty line are further reasons.

Key Elements

A responsible food system—which can manifest as a responsible food industry cluster at a local or regional scale—involves many sectors along the food supply and value chains. It centers regeneration, sustainability, local and ethical supply chains, accessibility, and fair wages and working conditions.

Regenerative, sustainable, waste-reducing practices

In a responsible food system, every aspect of the food system not only aims to minimize waste; minimize negative environmental impacts; and protect land, water, and energy resources for the long-term; but also to regenerate—or restore—these critical resources.[323]

Strong local and ethical supply chains, value chains, and markets

Local supply chains produce, distribute, and sell products within an area that is geographically close to consumption (see Local Economies chapter for more information) (Tropp and Moraghan 2017). Responsible food systems create local markets for locally produced products (GAFF 2021), which reduces the distance that food products need to be transported. Where local supply chains are not possible, ethical supply chains that center the well-being of people and the planet are prioritized[324] (see Fair Trade chapter for more information).

Accessible health-promoting products

Responsible food systems connect consumers to fresh, healthy foods that are nourishing and that do not contribute to chronic disease (GAFF 2021). They make health-promoting products accessible and affordable in areas that have historically lacked access to fresh produce (Economy League 2019).

Fair wages and working conditions

For a food system to be responsible, those working in the food industry—such as those working on farms, with food processors and distributors, in restaurants and other food hospitality, in food retail, and in waste management—need to earn family-sustaining wages, have safe and healthy work environments, and have access to career opportunities (Economy League 2019). Health insurance coverage, retirement benefits, and other aspects of job quality are also goals (Dumont et al. 2017).

Benefits

Proven and promising benefits of transitioning to a responsible food system are wide-ranging, including strengthened markets and quality jobs; reduced greenhouse gas emissions, pollution, and waste; and improved food access and food security—all of which align with CERF goals.

ECONOMIC HEALTH, COMPETITIVENESS, AND RESILIENCE

- **A healthy and resilient food economy.** When the supply chain is localized, ethical, and environmentally responsible, if not regenerative, it is better able to withstand market volatility and recover from shocks or stressors (Nichols et al. 2022; Misra 2014). Local food supply chains can reduce disruptions from events outside of the region such as climate-related disasters, as one expert explained. Meanwhile, crop diversification and rotation and other regenerative practices can improve soil nutrients and reduce water consumption,[325] which in turn can reduce producers' vulnerabilities to drought, crop losses, and related sales losses; and can increase production and thus revenue (GAFF 2021; Misra 2014).
- **Competitive products that support steady revenues and job growth.** Access to markets for locally and responsibly grown and produced products can meet the trending consumer demand for sustainable, fresh, and healthy products, and increased interest in supporting local businesses (Economy League 2019).[326] Closer connections between producers, distributors, and buyers can help producers and food retailers meet buyer demands in competitive markets (GAFF 2021). In addition, when supply chains are shorter and more efficient, fewer profits are lost to intermediaries; and producers may also benefit from more flexible payment structures (Tropp and Moraghan 2017; GAFF 2021). Aggregation of goods from small businesses, which make up the majority of food-related businesses in the region (see Appendix Figure 2), helps them secure procurement contracts with institutional buyers that deliver steadier revenues for businesses and allows them to hire more workers (Economy League 2019; Baker et al. 2019; Feldstein et al. 2017).

CLIMATE AND ENVIRONMENTAL

- **Reduced greenhouse gas emissions, pollution, and waste.** Responsible food systems reduce greenhouse gasses, pollution, and waste. For example, regenerative agriculture practices result in carbon sequestration, and less fertilizer use reduces nitrous oxide emissions (a potent greenhouse gas).[327] [328] Recovering manure from livestock operations for biogas, or diverting food waste from landfills with large-scale composting can reduce methane emissions,[329] [330] a greenhouse gas that is nearly 30 times more potent that carbon dioxide.[331] Additionally, reducing the distance that food and food waste travel decreases air pollution and carbon emissions (GAFF 2021).
- **Lower vulnerability to drought.** Agriculture is a resource-intensive industry; for example, it accounts for 70 percent of freshwater withdrawals globally.[332] The principles of a responsible food system recognize this, and through practices such as regenerative agriculture can

improve soil health and minimize water inputs.[333] [334] [335] Regenerative agriculture methods, along with on-farm water conservation solutions, can reduce vulnerability to drought (US Water Alliance 2016).

- **More disaster-prepared communities.** Networks formed to improve the local food system can also strengthen social ties in communities overall (Dumont et al. 2017). Social bonds across community members are critical for responding to the needs of disaster-affected communities (Aldrich 2017). For example, one well-networked food initiative provided emergency food boxes with fresh fruits and vegetables that met diabetic diet requirements after Winter Storm Uri in Texas, building on its Farm-Fresh Box program that supplied emergency food boxes throughout the COVID-19 pandemic (see Box 2) (GAFF 2021).

EQUITY

- **Fair wages and better working conditions.** A responsible food system has the potential to ensure family sustaining wages (Economy League 2019). "Good food" purchasing programs can encourage institutional buyers to make food purchases from suppliers that provide healthy working environments (Feldstein et al. 2017) and fair wages. Protections for agriculture laborers might include mandatory access to shade, water, and rest breaks (Athens 2022). And cooperative ownership and Fairtrade participation can give workers (including undocumented farmworkers) fair wages, as well as ownership and voice (see Cooperative and Fair Trade fact sheet for more information).[336] Furthermore, responsible agriculture practices limit chemical use, which can create safer working conditions for farm workers who are otherwise exposed to high levels of toxins such as pesticides (Feldstein et al. 2017). Plus, food diversion from landfills and technologies that reduce waste can reduce emissions exposures among those living closest to landfills and polluting industries (EPA 2023).
- **Health-supporting food.** Low-income areas often lack healthy food options (Economy League 2019). Responsible food systems support access to affordable healthy foods such as vegetables, fruits, and whole grains; programs that increase the availability and affordability of healthy foods in underserved neighborhoods can help combat hypertension, diabetes, and other diet-related diseases (Hodgson 2012; Grant 2022; Economy League 2019).
- **Wealth-building ownership opportunities.** According to experts, responsible food systems can facilitate land acquisition for landless food producers. For example, some programs allow immigrant farmers to legally migrate and purchase land, according to an interviewee. Additionally, cooperative ownership structures may expand food industry workers' ownership stakes at their jobs (see Cooperatives fact sheet for more information).

Prevalence and Adoption

Although we did not find comprehensive examples of an entirely responsible food system—which again, can manifest as a responsible food industry cluster at a local or regional scale—there are trends showing increasing prevalence of efforts to improve various pieces of the food system around the globe, in the US, and in California.

GLOBAL

In light of climate change, biodiversity loss, and the prevalence of food insecurity around the globe, as well as the likelihood of more acute shocks like COVID-19, public actors globally are thinking about how to make their food systems more responsible (GAFF 2021).[337] For example, principles of a responsible food system are embedded in the second United Nations Sustainable Development Goal to end hunger, achieve food security, improve nutrition, and improve sustainable agriculture.[338] Additionally, the United Nations hosted a Food Systems Summit in 2021, which convened stakeholders from across the globe in science, business, policy, healthcare and academia, as well as farmers, indigenous people, youth organizations, consumer groups, environmental activists, and others on developing tangible food systems transformation strategies.[339] Prior to that convening, more than 100 countries had committed to developing food systems transformation strategies.[340] By necessity, the private sector, including global food companies, is pursuing responsible practices such as environmentally sustainable production, supply chains, and distribution.[341] [342] Additionally, the fair trade movement is global and attempts to ensure workers' rights all along the supply chain (see Fair Trade chapter for more information).[343]

NATIONAL

In 2021, the Biden-Harris Administration announced a commitment to end hunger and malnutrition and to build sustainable resilient food systems, stating that more than $10 billion over multiple years will be invested in food systems transformation.[344] Food Action Plans and Food Policy Advisory Councils (FPACs) have been and continue to be created in, with, and for communities throughout the United States.[345] One expert interviewee estimated there were at least 300 FPACs across the US. Some efforts to change all or parts of the food system are regional in scope, such as the New England Food System Planners Partnership, a collaboration among Food Solutions New England and six state-level organizations.[346] Others are at the municipal level; for example, Seattle's Food Action Plan aims to create an equitable, sustainable, resilient, and health-supporting food system by aligning departments that manage food policies.[347]

More examples of efforts focused on aspects of a responsible food system can be found at various scales across the US, including those that focus on regenerative, sustainable, waste-reducing practices (White House 2022; Baker et al. 2019; EPA 2023); strong and ethical local supply chains, value chains, and markets (Tropp and Moraghan 2017; Dumont et al. 2017); accessible healthy food (Biehl et al. 2017);[348] [349] and fair working conditions.[350] [351] [352]

Other national movements such as One Fair Wage, Restaurants Advancing Industry Standards in Employment (RAISE), High Road Restaurants, and Restaurant Opportunities Centers United (ROC) are being led by private sector networks, composed predominantly of smaller businesses, to promote better working conditions, fair wages, and employee benefits in the restaurant industry.[353] [354] [355] And the Fair Food Network works to make healthy food more accessible by matching the face value of SNAP dollars spent on fresh fruits and vegetables at over 900 participating locations in dozens of states.[356]

BOX H.2

Example: The Common Market

The Common Market is an example of an organization that supports sustainable food production, strong local markets, job growth, and access to health-promoting foods.

The Common Market (TCM), established in Philadelphia, Pennsylvania in 2006, is a mission-oriented regional wholesale distributor that now has hubs in the Mid-Atlantic, Southeast, Texas, and Great Lakes regions and is actively expanding to other regions.[357] TCM is building supply chains for family farms and other producers who grow their foods in ways that restore the environment. They aggregate farm products and artisanal foods from small, local producers to distribute to regional vendors (GAFF 2021).

The Common Market Georgia sources products from within 200 miles of Atlanta to offer nearly 100 local products in the city (Dumont et al. 2017). TCM attempts to reach people in underserved communities who do not traditionally have access to fresh foods. For example, in 2022, their Farm-Fresh Box program distributed almost 300,000 boxes of fresh fruits, vegetables, and grains, some of which are distributed in partnership with healthcare institutions who ensure that food insecure patients or those suffering from illness have regular distributions of nutritious foods and instructions for how to prepare healthy meals (TCM 2022).

In addition to strengthening local distribution channels, TCM intentionally locates its distribution facilities in underserved areas to provide employment opportunities ranging from food safety and supply chain management roles to data management and marketing jobs (GAFF 2021).

REGIONAL/LOCAL

Some municipalities in California are planning and starting to implement food economy transitions, with progress visible in individual segments of responsible food systems across the state. For example, Sonoma County's food plan elevates agriculture and natural resources, economic vitality, social equity, and healthy eating as its four pillars (Sonoma County 2016). Elsewhere in the state, voluntary and mandated food waste reduction measures are being implemented (Baker et al. 2019);[358] pesticides and methane emissions are being reduced, and practices to build soil health and improve efficiencies in water use are being adopted (Esriva-Bou et al. 2023);[359] [360] [361] [362] [363] farms are selling food locally, and food retailers are accepting SNAP benefits;[364] [365] the state minimum wage for fast food workers recently increased, worker trainings for food operations are being offered, and food-related cooperatives are being formed (Abell et al. 2023).[366] [367]

Activities related to a responsible food system can also be seen in the Valley CERF region. For example, Fresno has an active Food Policy Council that has drafted a development strategy for the county (EPA et al. 2016; Fresno Metro Ministry and FCIP 2021),[368] and Fresno DRIVE supports climate-smart agrifood technology and local markets.[369]

Opportunities and Considerations

Opportunities to advance a responsible food system in the Valley CERF region—which can manifest as an industry cluster—are grounded in the presence of a large food producing economy, increasingly scarce water and other critical resources, climate trends, and the need to improve access to healthy food and good jobs throughout the region.

OPPORTUNITIES

- **Incentivize and support regenerative agriculture.** Food production is a major economic driver in the Valley CERF region (CVCF 2023). However, there are increasingly longer and more severe periods of drought in the region and, because groundwater basins are "critically overdrafted," some predict that up to 1 million acres of agricultural land may be fallowed in the San Joaquin Valley in the next decades (CVCF 2023). Further, polluted runoff containing manure and fertilizers is the leading cause of water quality issues in the region; and the Valley CERF region is among the states' top pesticide-using areas (CVCF 2023). To protect critical water sources and avoid widespread fallowing, both of which have concerning implications for the region's economy, producers in the region can be incentivized and supported to practice regenerative agriculture, which among many outcomes, can reduce water and fertilizer inputs

as well as reduce organic and other types of waste (Farm Bureau Financial Service 2020). As noted in the benefits section, regenerative agriculture can also help increase soil health and strengthen crop yield. A 2010 survey of Central Valley ranchers indicates there may be receptivity to incentives in the region: 77 percent of surveyed ranchers said they would consider participating in a program in which they receive payments for improving environmental benefits (Cheutum et al. 2011). Markets for environmental outcomes are growing among private companies attempting to meet emissions reduction goals, so it is an opportune time to explore private funding arrangements that support healthier agricultural practices.[370]

- **Strengthen "farm to table" channels, local processing, and local procurement.** Several actions can collectively solve for the paradox of a Valley CERF region that is a top food producing region yet highly food insecure with high rates of diet-related chronic conditions such as diabetes and high blood pressure (CVCF 2023). Strategically located retailers of affordable fresh and healthy foods in the Valley CERF region could improve access to healthy food for medically and financially vulnerable populations, especially if they accept and increase the value of food stamps to support the 21 percent of households in the Valley CERF region that receive cash assistance or food stamps (CVCF 2023). Beyond the local distribution and sale of fresh and healthy foods—especially those locally grown—increasing the amount of locally grown food that is processed and packaged locally can also contribute to economic development. Further, the many institutional actors in the Valley CERF region including government entities, schools, universities, hospitals, and prisons could establish procurement policies that prioritize local purchasing (see Local Economies chapter for more information). Producer and processing cooperatives (see Cooperative Economies chapter for more information), community purchasing alliances, regional food hubs, or other aggregation and distribution organizations could be strengthened or formed to help secure commitments from anchor institutions while also increasing jobs and strengthening producers' connections to restaurants and grocery stores in the region (Baker et al. 2019; EPA et al. 2016; USDA 2012).
- **Invest in shared ownership models.** Nearly one in every five people in the Valley CERF region lives below the poverty line and unemployment rates are consistently higher in the region than in other parts of California (CVCF 2023). Agricultural production employs the largest share of workers in the Valley CERF region's food economy, and the food hospitality industry employs the second largest number of workers in the region's food economy and has the lowest employee wages (see Appendix Table 3).[371] Fast food work is one of the top forecasted growth occupations in the Valley CERF region – without intervention—but tends

to be minimum wage, non-tip-earning work (CVCF 2023).[372] It is estimated that someone needs to be earning at least $21 an hour in the Valley CERF region to afford a 2-bedroom home (the equivalent of about $43,600 annually, assuming full-time employment), and may need to make much more to thrive (CVCF 2023). Stronger regional support for One Fair Wage and other similar campaigns could influence decisions to legally increase the wages of a substantial portion of workers in the Valley CERF region. Regardless of state or local policy changes around minimum wages provision, stakeholders in the Valley CERF region could shift the market and progress towards desired job quality goals by investing in shared ownership models. Shared ownership models, including agricultural cooperatives, community-owned grocery stores, and worker-owned food processing and hospitality businesses are prevalent across the food system. These ownership models show evidence of providing higher wages and other aspects of job quality such as safety, career opportunities, retirement plans, and health insurance that also need improvement in the Valley CERF region, especially given that almost half of the population relies on public health insurance (CVCF 2023). See Cooperative Economies chapter for more information on the benefits of cooperative economies and ways to invest in shared ownership models, from capital and technical assistance to peer networks and other fundamentals.

- **Form and resource a Regional Food Policy Advisory Council.** Fresno already has an active Food Policy Council advancing the goals of the Fresno Food Security Network and has drafted a development strategy for the county (Fresno Metro Ministry and FCIP 2021).[373] Within the strategy, Fresno County stakeholders identified the need to establish a Food Policy Council to coordinate cross-sector collaborative action (Fresno Metro Ministry and FCIP 2021). Extending food governance to the regional level would strengthen regional food system coordination and empower more community members to influence the trajectory of the food system. Such backbone structures need to be well-resourced to be successful because, as several expert interviewees noted, coordinating across stakeholders is a full-time job that cannot be adequately done on a voluntary or part-time basis.

CONSIDERATIONS

- **Pricing challenges.** As one expert explained, most buyers make purchases based on price, which is an important consideration in a region where 20 percent of the population lives below the poverty line. Experts argue that there will always be a preference for less sustainable but cheaper options as long as social and environmental benefits are excluded from pricing; and "true-cost accounting" is an area where government is unlikely to lead

(Baker et al. 2019). Since healthy food is grown at a premium, strategies to keep healthy food affordable for the lowest-income consumers will be needed.

- **Technology and data limits.** Parts of the Valley CERF region do not have access to broadband, which is required for certain regenerative agriculture technologies like soil sensors that enable more precise water inputs. Therefore, advancing certain technology-dependent regenerative agriculture approaches may require upfront investment in broadband.[374]
- **Challenges to family-sustaining wages.** The food industry is dominated by low-skill, low-wage jobs and low profit margins (Economy League 2019). Given this reality, achieving a tenable balance of financial return to businesses and fair worker pay has remained challenging (Dumont et al. 2017). However, the fair trade framework can offer insights on how (see Fair Trade chapter for more information). Regardless, many food business will likely need technical assistance and other supports to help them increase job quality (Baker et al. 2019).

Policies and Other Levers

There are both enabling and constraining policies and practices that will influence the regions' ability to transition to a responsible food system in part or in full.

ENABLING

- **Mandates.** Government mandates can stimulate the uptake of responsible food system practices. For example, requiring municipal organic waste collection services and "pay-as-you throw" programs could expedite food waste diversion from landfills.[375] [376] [377] In California there is already a mandate to reduce organic waste in landfills by 75 percent by 2025;[378] but, because residential waste collection and processing requires both human-power and costly and regulated composting infrastructure, waste diversion mandates must be funded.[379] [380] Right to Food laws can increase the pressure on governing entities to ensure that every person's food needs are met;[381] and animal welfare requirements can improve conditions for animals who are farmed.[382] Mandates can also set living wage requirements for farm laborers, restaurant workers, and other low-wage workers (Maricelo 2023).[383] One expert interviewee suggested that legislation could also mandate entities who receive government funding to meet sustainable production and fair pay standards.
- **Funding and incentives.** Grants, loans, and creative financing can support businesses to implement changes that support responsible food system practices. Financial incentives such as sustainable business tax credits and payments for environmental outcomes, for example,

can incentivize producers to adopt regenerative or circular management measures (Farmland LP 2017; Gresham et al. 2021).[384] [385] Incentives can also work for food consumers: participation in programs such as Double Up Food Bucks and Market Match can incentivize purchases of healthy food among lower-income populations.[386] [387] Furthermore, procurement policies can be leveraged to prioritize sourcing local, ethical, and sustainable food (Feldstein et al. 2017).

- **Cross-sector coordination structures.** Strengthening or establishing backbone organizations for governance and logistics can strengthen regional food systems. For example, expert interviewees explained that Food Policy Councils play central roles in incorporating the lived experiences of marginalized community members in food policy and program agenda setting. Organizations that aggregate and distribute food from small producers can help producer groups reach the necessary scale to secure contracts with large institutions (Gwinn and McCann 2017). Partnerships across civil society, the private sector, and government entities will also be necessary to pursue true-cost accounting initiatives that internalize environmental and social benefits in product pricing (Baker et al. 2019); they are also necessary to implement certain circular practices relevant to responsible food systems (see Circular Economy and Circular Manufacturing chapters).
- **Data for monitoring, certification, and proving impact.** Investing in digital infrastructure to support supply chain transparency and to monitor impacts can support better decisions and prevent potentially harmful impacts on the environment and laborers (Poore and Nemecek 2018; Baker et al. 2019). Data might also help businesses certify sustainable practices through B Corps or Fairtrade, for example, and help them differentiate their products as healthier or more sustainable to gain competitive advantages (Baker et al. 2019).[388] [389]
- **Training and education.** Technical assistance, especially when paired with financial support, can support businesses to adopt socially and environmentally responsible practices.[390] In addition, consumer-focused education programs can promote healthy food consumption and ways of reducing organic waste (Baker et al. 2019).

CONSTRAINING

- **Federal Farm Bill legislation.** The outcome of negotiations for the next Farm Bill (slated for 2024), an omnibus bill negotiated every five years, will have major implications for either advancing aspects of a responsible food system or for significantly curtailing responsible food system progress. The Farm Bill dictates federal spending on agriculture and other food-related activities. It has sweeping influence, including on whether producers are incentivized to

engage in monocrop farming, and what degree of financial support efforts to ensure healthy food access will receive.(CRS 2023).[391] For example, the Farm Bill has been the primary source of nutrition spending through the Supplemental Nutrition Assistance Program; a reversal of funding for this could cut off food access for low-income populations (CRS 2023).[392] The Farm Bill also presents a major opportunity for the federal government to support climate-smart agricultural practices, however, if Farm Bill funding for conservation programs that help landowners steward their land is stripped, it would be a major setback for land-related climate innovations.[393] The fate of animal welfare is also up in the air as Congress debates the Ending Agricultural Trade Suppression Act (EATS) which, if passed, could jeopardize public health and safety.[394] Despite the power of the Farm Bill, there are still be opportunities for local action.

- **Lack of political will or industry buy-in.** The absence of champions in leadership roles in government can constrain advancement toward responsible foods systems, as can lack of buy-in and interest from industry actors, according to expert interviewees.

One Water Management

One Water management is an integrated approach to water resources management informed by the fact that all water—including drinking water, wastewater, stormwater, groundwater, and surface water—is part of one water cycle, which itself is impacted by land use.

Orienting around the land-water relationship creates the need for a watershed approach to water management. Following this, the goal of One Water management is to holistically and sustainably manage finite water resources "for long-term resilience and reliability" in order to meet community and ecosystem needs (Arabi et al. 2021). To take the integrated approach needed to manage water systems in this way, One Water management practitioners pursue coordination across sectors, all of which demand water and impact the water cycle in some way (US Water Alliance 2016). One Water management involves planning and administration, land use and siting, engineering and design,

materials and supply chain, building and construction, operations and maintenance, and monitoring and testing, among other activities.

Table I.1 includes a summary of the key elements and benefits of One Water management and Box I.1 summarizes key opportunities and considerations, all of which are explored in more detail in the pages that follow.

TABLE I.1

Key Elements and Benefits of One Water Management

Key Elements	Key Benefits
▪ Integrated management of water resources including drinking water, wastewater, and stormwater ▪ Sustainably managed water that meets long-term needs ▪ Inclusive water management that ensures affordability for all	▪ Stable business operations and cost savings ▪ Jobs and quality jobs ▪ Increased water conservation and drought resilience ▪ Reduced water pollution ▪ Reduced risk of severe wildfire ▪ Affordable water rates for vulnerable populations ▪ Community ownership in planning and governance

Source: Urban Institute analysis

BOX I.1

Advancing One Water Management in the Central San Joaquin Valley

Benefits of One Water management in the economic health, climate action and equity realms align with CERF goals for the Central San Joaquin Valley. A One Water approach aims for safe, accessible, reliable, affordable, and sustainable water supply, which is foundational to all economic development. One Water management can reduce demands on scarce water resources and has the potential to reduce the negative impacts of severe climate-related events. The approach can also support equity, including by meeting the water-related needs of the most vulnerable populations, if implemented as it is envisioned.

The One Water management approach has a decade-long history in parts of California and is increasingly being adopted in regions across the state. The approach builds on collective management principles that have been instilled through state mandates to manage groundwater at the watershed-level. As a whole, the movement is still in its early phases which presents an opportunity for the Valley CERF region to lead in One Water management. A One Water approach—which emphasizes upstream and downstream and cross-sector collaboration for land and water resources management—could build upon the foundation set by the Valley CERF coalition and could be supported by federal,

state, and philanthropic funding sources that are available for water infrastructure and quality improvements.

Key Elements

The One Water management approach asserts that all water has value and should be managed in an integrated, sustainable, and inclusive way (US Water Alliance 2016).

Integrated

Currently, most water management approaches are siloed: water resources such as drinking water, wastewater, and stormwater are managed separately. One Water management aims to break down those silos with an integrated watershed-scale approach. This involves engaging both upstream and downstream partners, and creating the conditions for residents, industry leaders, farmers, environmentalists, policymakers, and other stakeholders to advance healthy water systems (US Water Alliance 2016).

Sustainable

One Water management supports resilient water sources that achieve economic, environmental, and social benefits over the long term by allocating water resources for societal and economic needs in a way that maintains hydrological functioning for future needs and uses (US Water Alliance 2016; Civitellio and Gruere 2016). This may include incorporating nature-based infrastructure that improves water quality and provides other community benefits as well as employing advanced technologies that can, for example, reclaim wastewater as a resource (US Water Alliance 2016).

Inclusive

One Water management is a systems-level approach that touches all sectors, and involves community members in water planning, governance, and monitoring. The approach emphasizes the intentional consideration of and engagement with people with low incomes and communities of color (who are often disproportionately exposed to environmental harms) to ensure that water is accessible and affordable for all (US Water Alliance 2016).

Benefits

Proven and promising benefits of One Water management include stable business operations and cost savings, quality jobs, improved water quality and better resilience through drought, and community

empowerment. These benefits collectively drive toward CERF goals to advance a competitive and resilient economy, climate action, and equity.

ECONOMIC HEALTH, COMPETITIVENESS, AND RESILIENCE

- **Stable business operations and cost savings.** One Water management practices such as diversifying water supply and improving water usage efficiencies can result in more reliable services and reduced business operations disruptions (US Water Alliance 2016). One Water management can help businesses use fewer overall water inputs, for example, through water re-use practices (Arabi et al. 2021). Conserving and protecting source waters from pollutants and sediments can prevent future groundwater overdrafts, for example, and can save on water treatment costs down the line (Civitellio and Gruere 2016; US Water Alliance 2016; Arabi et al. 2021), which are passed on to the user through rates. Further, integrated management, such as of wastewater and stormwater, can reduce business closures, such as from sewage backups or localized flooding, as well as inventory loss or property damage (E2 Michigan 2019). Well maintained systems also reduce losses from leakage or breaks, and can prevent, if not contain, the occurrence of costly water-borne diseases (E2 Michigan, 2019; Choffnes and Mack 2009).
- **Jobs and quality jobs.** One Water Management touches a variety of occupations ranging from the field, to the office, to water-related facilities, each of which require qualifications ranging from a high school diploma to an advanced degree (E2 Michigan 2019). Water-related sectors in the Valley CERF region provide wages that are, by average, higher than the region's 2-bedroom housing wage of about $21 per hour, or—assuming full time employment—approximately $43,600 annually (CERF 2023).[395] As noted by an expert interviewee, investments in integrated water systems—and the capacity of staff to support them—can result in more stable water-systems jobs as compared to the part-time positions currently offered by many under-resourced systems.

CLIMATE AND ENVIRONMENTAL

- **Increased water conservation and drought resilience.** Fresh water is an increasingly limited resource. Building partnerships across the watershed to reduce water consumption can lead to healthier aquifers and surface waters, which can support communities during droughts (US Water Alliance 2016).

- **Reduced water pollution.** The use of green infrastructure such as bioswales, pervious pavements, trees, and green roofs can reduce the amount of polluted stormwater that would otherwise overflow into rivers and streams during precipitation events (McFarland et al. 2019; Sharma and Malaviya 2021; Smart Surfaces Coalition). Additionally, the water infiltration that green infrastructure systems support can help recharge aquifers.[396] Communication between upstream and downstream water users and across industries can also help prevent nutrients, fertilizers, and pesticides applied to land from harming water sources (US Water Alliance 2016).
- **Reduced risk of severe wildfire.** Water and wildfires are intricately related. Overconsumption of water can contribute to dryer conditions and thus the severity of wildfires; and wildfires threaten water quality. Certain One Water land management strategies can help to addresses wildfire risks while also reducing the risks of severe flooding, erosion, and sediment pollution in bodies of water.[397]

EQUITY

- **Affordable water rates for vulnerable populations.** Rate assistance for low-income customers is part of the One Water model and can ensure access to water services even among lower-income populations (US Water Alliance 2016). A new pricing model based on property characteristics is being advanced by the US Water Alliance and its partners; it shows promise but is still in a pilot phase (US Water Alliance and Stantec 2023).
- **Community ownership in water planning and governance.** Supporting community capacity to partner in water management planning and governance expands who is involved in oversight of water resources (US Water Alliance 2016). Goals and approaches that are grounded in the lived experiences of marginalized community members can lead to water solutions that work for vulnerable and historically underrepresented segments of the population. For example, under the Santa Ana One Water One Watershed plan, there is a program that seeks direct input from underrepresented and disadvantaged populations (see Box I.2).

Prevalence and Adoption

The One Water management approach is recognizable in water management efforts around the globe, but the term “One Water” is not used frequently outside of the United States. In California and the Valley CERF region, there is a foundation of integrated regional water management approaches to build on.

GLOBAL

One Water terminology is not widely used internationally, though the principles of integration, sustainability, and inclusion are present. For example, the United Nations Water Action Agenda—a register of commitments to implement Sustainable Development Goal (SDG) 6 (Ensure Access to Water and Sanitation for All)—highlights the need for an approach to water that is integrated across sectors (United Nations 2022).[398] [399] SDG 9 (Build Resilient Infrastructure) and SDG 11 (Make Human Settlements Inclusive and Safe) also align with One Water.[400] Meanwhile, European institutions are exploring funding mechanisms for nature-based solutions to improve water management (Hudson et al. 2023).

NATIONAL

Exploration of the One Water Management approach is growing in the United States with support from the US Water Alliance, a national membership organization established in 2008.[401] According to an interviewee, the movement grew out of the water utilities sector and a recognition that a backbone organization was needed to support a shared desire for a shift in water management approaches. As an indicator of the national interest, in 2022, the US Water Alliance's annual One Water Summit attracted participants from 263 cities.[402] [403] The US Environmental Protection Agency (EPA) is also promoting a One Water approach.[404] However, One Water is still in the early phases of adoption according to a 2023 survey where 60 percent of respondents said the movement was in a "pre-awareness" or "awareness building phase" (US Water Alliance 2023). Further, a national expert in the water sector noted that not all regions currently using the One Water term are, as of yet, comprehensively operationalizing One Water as it has been imagined. But there is currently rare national investment for improving water infrastructure, as evidenced by the more than $50 billion allocated to water infrastructure improvements in the Infrastructure Investment and Jobs Act.[405]

REGIONAL/LOCAL

Several cities in California have developed One Water management plans and some elements of the approach are being implemented. For example, One Water LA published a ten-part One Water LA 2040 Plan but updates on its implementation are not available (One Water LA 2018).[406] Monterey One Water was recently awarded more than $10 million to expand its Pure Water Monterey Groundwater Replenishment Project, which turns wastewater into a safe water supply to replenish groundwater.[407]

Grants through California's Integrated Regional Water Management (IRWM) programs have been available since 2002 and support One Water-related efforts across California, such as the One Water

One Watershed plan being implemented by The Santa Ana Watershed Project Authority (see Box I.2). The Sustainable Groundwater Management Act of 2014 (SGMA) has increased uptake of IRWM grants because it mandated the formation of Groundwater Sustainability Agencies and Groundwater Sustainability Plans for basins or sub-basins that are designated as high priority.[408] Eight of these priority groundwater basins are in the Valley CERF region; of note, region's basins were indicated as not just priority areas but as "critically overdrafted" in 2020), including the Chowchilla Subbasin (Madera County); Delta-Mendota Subbasin (Fresno and Madera counties); Kaweah Subbasin (Kings and Tulare counties); Kings Subbasin (Fresno, Kings, and Tulare counties); Madera Subbasin (Fresno, Kings, and Madera counties); Tule Subbasin (Tulare County) Tulare Lake Subbasin (Fresno, Kings and Tulare counties); and Westside Subbasin (Fresno and Kings counties).[409] [410] The Kings Basin Water Authority is implementing the Kings Basin Integrated Water Management Plan which covers both urban and rural areas; 17 members and 40 interested parties are involved (Kings Basin Water Authority 2018).[411]

Opportunities and Considerations

The Valley CERF region has the need and opportunity to be a leader in the One Water sphere, supported by the current foundation of cross-sector collaboration, a precedent of some watershed-wide management, and climate change-related drivers in the region. However, implementing a One Water management approach requires major financial investments and some technical constraints may pose challenges.

OPPORTUNITIES

- **Integrate water governance across the region.** The Valley CERF region has a foundation of watershed scale management on which to build because of the integrated regional watershed management plans that are already being implemented across the region.[412] But even broader regional governance and real-time communication across jurisdictions could increase the reach of regional water resources. Utilities can implement joint water accounting and auditing systems to track the regions' water across all its forms—from groundwater, drinking water, surface water, and wastewater or stormwater (FAO 2018).
- **Invest in water recycling, recharge projects, and other water-saving and-reuse measures.** Drought in the Valley CERF region places stress on individuals, businesses, and the overall economy; and the region's large rural Latinx population has been among the first group to face water shortages (CVCF 2023). Water reclamation, re-use, and recharge projects can help

address the vast water scarcity issues in the region. Investing in water purification technologies, for example, can enable water re-use (see opportunities in the Circular Economies chapter). The region can leverage some of the $8.3 billion the Biden-Harris Administration has committed to water infrastructure projects as well as the research the EPA is leading on enhanced aquifer recharge practices.[413] [414] Recharge projects could help maximize water capture during precipitation events like those experienced in 2023 (CVCF 2023).[415] Green infrastructure investments could also help groundwater recharge and pollutant filtration; and implementing water conservation measures using technologies such as weather-based irrigation controllers to determine watering schedules can reduce unnecessary water use.[416] Ultimately, re-use and conservation efforts could help agricultural producers avoid paying for expensive emergency water, according to an expert interviewee. Plus, investments in advanced water technologies might lead to more and more specialized jobs (E2 Michigan 2019).

- **Improve upstream land management.** Fertilizers, pesticides, and sediment are among the pollutants entering water sources in the Valley CERF region, which is largely rural and has a heavy agricultural presence (CVCF 2023). As one expert interviewee emphasized, what happens on land also happens to the water, so land solutions are also water solutions. For example, measures to reduce polluted runoff from agricultural land and roadways as well as forest management initiatives to protect against wildfires can reduce pollutants and sediments entering waterways (Shah et al. 2022).
- **Support channels for community voice, information sharing, and leadership building.** Stakeholders in the Valley CERF region are well-versed in the challenges posed by drought and wildfire. Channels to elevate the lived experiences of community members, including low-income populations, producers, and other highly impacted individuals, as well as actions that position these stakeholders as leaders, can result in better, more inclusive, and more equitable water management solutions (Faust et al. 2021). Consultation with grassroots organizations, small businesses, small producers, and disadvantaged populations can ensure an inclusive approach across urban and rural divides.

CONSIDERATIONS

- **Funding needs for planning and infrastructure investment.** Due to water infrastructure being chronically underfunded, a large upfront investment may be required to close infrastructure gaps in the Valley CERF region.[417] Recent federal investment in water infrastructure—though notable—will not be enough to meet the need, according to an expert interviewee, and states

or local sources will continue to be the primary sources of water infrastructure funding.[418] Further, because One Water requires a new approach to water management, funding for planning efforts will also be necessary to facilitate coordination across numerous parties and to support transitions to new practices. Upfront planning and quality assurance measures will be critical to ensuring that relevant water re-use technologies are pursued, and that state and local codes and regulations allow for their use. Furthermore, appropriately siting infrastructure interventions will require consultation with technical experts and clear communication with community members (McFarland et al. 2019; US Water Alliance 2016).

- **Expenses to rate payers.** There is evidence that green infrastructure is less expensive than grey infrastructure, and expert interviewees noted that protecting water at the source can cost less than treating it downstream;[419] [420] [421] although we found one report that suggests otherwise (Heberling 2015). Regardless, a One Water approach will likely demand water rate increases to support planning, design, construction, and ongoing operations and maintenance. Given that a fifth of the Valley CERF population receives public assistance and lives below the poverty line (CVCF 2023), it will be important to support water users who may not be able to afford rate increases.

Policies and Other Levers

Policies and relationship-building, among other levers, can help advance the adoption of a One Water management approach in the Valley CERF region. A few obstacles related to ensuring that regional-scale water investments are a priority in the region will need to be overcome.

ENABLING

- **Connectivity and partnerships.** Watersheds don't follow political boundaries, so for a watershed approach to be successful, government agencies, industry leaders, farmers, environmentalists, and academics—upstream and downstream—must work together (US Water Alliance 2016). Valley CERF is a regional coalition composed of stakeholders across these sectors and has a network that extends beyond the members of the coalition; this offers a strong foundation to build on to advance One Water management.
- **Strong incentives.** Various incentives structures can be utilized to encourage more efficient water-resources practices in the Valley CERF region.[422] Water efficiency certifications and rebates such as those supplied through EPA's WaterSense program at the residential scale, and SoCal WaterSmart at the commercial scale, can encourage the uptake of water-efficient

practices.[423] [424] [425] Projects funded with outcomes-based payments such as Environmental Impact Bonds can also incentivize nature-based solutions that improve water quality and capture, for which federal funding is also available (City of Atlanta Department of Watershed Management 2023; White House 2022).[426] Farmers could be offered payment through soil carbon credits or other more direct payments to incentivize their reduced use of fertilizers, which could improve upstream water quality (Oldfield et al. 2021). Further, fees such as those imposed for excess runoff or parcel taxes on impermeable surfaces can help deter undesired behavior while helping to fund projects that protect water sources (NRDC 2018; Chapelle et al. 2021).

- **Flexible transferable water rights.** Economic tools such as transferable water rights can put more power in the in the hands of local stakeholders to protect watershed health as an alternative to large-scale fallowing directives which cause social disruptions, according to an expert interviewee. Continued efforts to streamline water transfers and clarify rights can support the effective use of water rights transfers across the Valley CERF region (SOAR Water Transfers Action Team 2014). An expert interviewee noted that more flexibility and rules around water transfers and impoundment can help the region make the most of "high-flow moments" like those experienced in the Valley CERF region in 2023 (CVCF 2023). Given the entrenched framework of water rights in California, the Valley CERF coalition may experience some resistance.

CONSTRAINING

- **Lack of buy-in from leadership and deferred maintenance.** According to an expert, One Water management works best if you start with leadership recognizing the importance of One Water management. But experts shared that water infrastructure often falls behind other political or emergency priorities. In fact, one expert interviewee noted that sometimes it takes failing infrastructure to capture local attention. But deferred maintenance and violations that result in sewage overflows, for example, make it difficult for communities to begin to talk about One Water management solutions, therefore, it may be necessary to address any immediate infrastructure failures in advance of engaging in broader conversations about the logistics of watershed-level collaboration.
- **Limited funding.** A field expert shared that government resources earmarked for water infrastructure are not enough to implement all the projects that are ready to go and, because One Water management involves land use, funding for projects beyond "traditional" water infrastructure (i.e. pipes and treatment plants) will be necessary. Creative financing

mechanisms that tap philanthropic and state revolving funds will need to fill the funding void. Of note, the inclusion of land-related actions in project proposals could actually widen the breadth of funding that can be leveraged for One Water, such as funding for forestry, parks, and green space, which is often overseen by environmental or conservation agencies.[427]

- **Regulatory and code standards.** Water re-use in California is regulated by California Plumbing Codes and it may take time for water re-use project permits to be approved.[428]

BOX I.2

Example: One Water One Watershed in the Santa Ana Watershed

The One Water One Watershed (OWOW) plan is the Integrated Regional Water Management (IRWM) plan for the Santa Ana River Watershed. The OWOW approach aims to address all water-related issues by integrating water supply, water quality, recycled water, water use efficiency, energy use, land use, and planning. OWOW connects hundreds of stakeholders from different disciplines.[429]

OWOW has adopted an inclusive governance model with an 11-member Steering Committee made up of public, private, non-profit, elected, and appointed representatives from multiple counties. The OWOW planning process was initiated by stakeholders in 2007 and involved engaging agencies and people from across the watershed.[430] It was most recently updated in 2018 with over 100 contributing authors. The plan "supports improved sustainability, resilience, and quality of life throughout the Santa Ana River Watershed through 2040."[431]

The 2018 update was informed by 10 workgroups focused on: 1) water resources optimization; 2) recycled water; 3) disadvantaged communities and tribal communities; 4) climate risk and resilience; 5) integrated stormwater management; 6) land use and water planning; 7) natural resources stewardship; 8) water quality; 9) water use efficiency; and 10) data management and monitoring. The Watershed has a program that specifically explores the needs and strengths of economically distressed or underrepresented watershed communities by collecting one-on-one and group interview data to establish technical assistance priorities.[432]

Over $203 million in funding has been distributed to projects throughout the watershed through three voter-approved water bonds. Funding has been used to replace sewers, install levees, expand recharge facilities, and create a groundwater bank, among other projects.[433] A Water-Energy Community Action Network (WE CAN) is supported by the California Greenhouse Gas Reduction Fund which targets assistance for low-income communities.[434]

Circular Manufacturing

The manufacturing industry consists of businesses that make products ranging from food products, materials, chemicals, and textiles, to electronics, transportation, and machinery. Counter to linear manufacturing's model of "take-make-use-dispose," circular manufacturing reuses materials or components from existing products to manufacture new products instead of extracting virgin resources from nature (Kumar et al. 2019).

Products and materials are designed for re-use through innovative technologies and production practices that attempt to minimize energy and water use and waste along supply and value chains while maximizing resource longevity and allowing for natural resource regeneration.[435] Beyond manufacturers, businesses that recycle, refurbish, repair, and maintain products—as well as those that sell these types of products—can also have a role in a circular manufacturing cluster.

Table J.1 includes a summary of the key elements and benefits of circular manufacturing and Box J.1 summarizes key opportunities and considerations, all of which are explored in more detail in the pages that follow.

TABLE J.1

Key Elements and Benefits of Circular Manufacturing

Key Elements	Key Benefits
▪ Efficiently use energy, renewable, and recoverable inputs ▪ Design and make products for re-use and regeneration ▪ Recover manufacturing byproducts and repurpose excess ▪ Innovate with technology design, engineering, and materials	▪ Reduced costs and increased profits ▪ Increased supply chain stability ▪ More well-paying jobs ▪ Competitive products ▪ Reduced emissions ▪ Reduced resources use ▪ Reduced waste ▪ Reduced biodiversity loss

Source: Urban Institute analysis

BOX J.1

Advancing Circular Manufacturing in the Central San Joaquin Valley

Evidence suggests that CERF goals on economic health and climate action can be advanced through Circular Manufacturing, especially via the more proven benefits related to reduced materials costs and demands on non-renewable raw resources. Indirect equity benefits are also possible if circular manufacturing is implemented with an eye toward justice implications.

Circular manufacturing technologies are regularly researched with support from federal funding, but many of the initiatives to advance circular manufacturing across the country, in California, and in the Valley CERF region are new and relatively small scale. However, circular practices have been adopted by private manufacturing companies and a range of circular manufacturing technologies are being piloted.

Several California laws related to waste diversion paired with federal funding for bioindustries and recycling create an enabling environment to pursue circular manufacturing in the Valley CERF region, particularly for the production of biobased products given the Valley CERF's excess agricultural waste.

Key Elements

The key principles of circular manufacturing extend the principles of a circular economy (see Circular Economy chapter) to manufacturing.

Efficiently use energy, renewable, and recoverable inputs

Circular manufacturing involves reducing the pressures on finite natural resources by focusing on the use of renewable and reclaimed materials, and using them efficiently. Minimizing energy, water, materials, and other inputs, as well as using renewable and recoverable inputs, contributes to the circular economy principles of eliminating waste through efficient resource use and regenerating nature (see Circular Economy chapter for more information).

Design and make products for re-use and regeneration

Intentional design and selection of inputs enables the recirculation of manufactured materials (PWC 2021). Circularly manufactured products are designed and made with full product life cycles in mind (so that component materials can be sent back through the loop as many times as possible), and with consideration for efficient disassembly, recyclability, durability, or enhanced maintenance and repair (Del Borghi et al. 2022; Dumee 2022). This could include product designs in food manufacturing, for

example, that return biological materials to land to regenerate nature (see Circular Economy chapter).[436]

Recover manufacturing byproducts and repurpose excess

The excess and by-products from manufacturing which, in linear manufacturing, would otherwise be disposed of as waste, are recovered and used as inputs to manufacture other products and materials. Similarly, the values of existing products that have reached the end of their present lifespans are recaptured or recovered through remanufacturing, recycling, or upcycling, for example, by turning fabric cuts into new garments or insulation (Aus et. al 2021);[437] or by recycling glass into new glass bottles.[438] Repurposing a product at the end of its present use increases product and material lifecycles (PWC 2021).

Innovate with technology

Innovations in technology, industrial design, engineering, material science, and data are central to circular manufacturing. For example, innovations in processing technologies and operations allow waste materials to be transformed into higher value materials; and innovations in data software and open data platforms can support supply chain transparency, traceability of materials, and facilitate matching across supply chain actors for the use of reclaimed materials.[439]

Benefits

Circular manufacturing benefits range from reduced costs, increased profits, increased supply chain stability, competitive products, and jobs to reduced emissions and use of natural resources, which align with CERF goals of economic competitiveness and resilience as well as climate action and environmental health. Circular manufacturing, as with the circular economy framework, requires intentionality to advance equity outcomes (see the Circular Economy chapter for more information).

ECONOMIC HEALTH, COMPETITIVENESS, AND RESILIENCE

- **Reduced costs and increased profits.** Circular manufacturing can reduce material costs for companies. One estimate finds that circular practices could deliver European Union companies cost savings in the range of 12 percent to 23 percent for materials alone.[440] Advancing closed-loop recycling of polyester in California is predicted to have an economic impact of $5.5 billion to $6.5 billion from land use reduction, chemical use reduction, jobs created and GDP growth from jobs, and revenue growth.[441] And, more efficient resource use could result in a $2 trillion injection in the global economy by 2050 according to some

estimates (Ekins and Hughes 2017). In addition, using excess or byproducts as inputs for other manufacturing supply chains can reduce waste removal costs while also capturing byproduct values, thus helping to reduce expenses while also generating new revenues for manufacturers, according to an expert interviewee (Ellen MacArthur Foundation 2013).

- **Increased supply chain stability.** By recirculating materials, pressure on supply chains to acquire raw and often increasingly scarce resources is reduced. The use of secondary resources, especially if they are local, can also reduce import dependency, vulnerability to price volatility, and risks from shipping bottlenecks or other supply chain disruptions. [442]
- **More well-paying jobs.** The adoption of circular practices by manufacturing companies can create new jobs along supply chains where new markets are created.[443] By averages, most manufacturing sectors tend to pay above the region's 2-bedroom housing wage (see Appendix Table 5).[444]
- **Competitive products.** Evidence suggests that products which are sustainably produced from used materials have an edge in the market, and may even generate premium returns based on consumer preferences (Shikha et al. 2021; Boyer et al. 2021)

CLIMATE AND ENVIRONMENTAL

- **Reduced GHG emissions.** Diverting waste from landfills through material re-use leads to lower greenhouse gas emissions including methane, a gas nearly 30 times as potent as carbon dioxide (Blair and Mataraarachichi 2021).[445] Increasing energy efficiency in manufacturing and shifting to renewable sources also reduces carbon dioxide emissions (Ellen MacArthur Foundation 2021).
- **Reduced resources usage.** Circular practices reduce inputs throughout the manufacturing process, including with energy efficiencies and reduced use of non-renewable raw materials (Weghman 2020; Bianchi and Cordella 2023; Ellen MacArthur Foundation 2021). Circular practices also reduce the amount water used to manufacture products such as textiles, which currently accounts for approximately 4 percent of global freshwater withdrawal.[446]
- **Reduced waste.** Reducing the overall waste stream can reduce the amount of waste in landfills, including toxic waste. Doing so reduces negative environmental outcomes such as off-gassing and leaching, the latter of which occurs when landfill linings leak.[447]
- **Reduced biodiversity loss.** Reducing the extraction of raw materials prevents habitat loss, biodiversity loss, and ecosystem disruption (Günther et al. 2023).

EQUITY

Some scholars critique circular economy practices for the focus on technological innovation, ecology, and economy without naming equity (see Circular Economy chapter for more information). Others note equity benefits are implicit in the circularity approach (Ashton et al. 2022). However, as with the circular economy framework more broadly, with intention, equity can be directly and indirectly realized through circular manufacturing such as job quality (Forti et al. 2020; Weghman 2020) and environmental justice (Pastor et al. 2001; WHO 2018; de Sa and Korinek 2021.

Prevalence and Adoption

Circular manufacturing models are being explored globally, in the United States, in California, and even in the Central San Joaquin Valley, but many are still in a proof-of-concept phase.

GLOBAL

Circular manufacturing practices have been adopted around the globe, however, according to the 2023 Circularity Gap Report, only 7.2 percent of what we use globally gets circled back into the economy (see Circular Economy chapter for more information).

European regulators have taken steps to increase circularity in some segments of manufacturing. For example, in 2009, an Ecodesign Directive established rules for the European Union for improving the designs of certain products, such as household appliances.[448] In 2022, an Ecodesign for Sustainable Products Regulation was proposed, which would apply to more products and create requirements around product durability, reusability, upgradability, reparability, carbon and environmental footprints, among other product characteristics.[449] And, an international working group composed of at least 68 countries has gathered regularly since April 2021 (at least 8 times) to share practices on greening government operations, including visions for the role of governments as purchasers that can ensure responsible resources use and that products are manufactured to last longer.[450]

Sustainability and circularity are also becoming more important to consumers across the globe: a survey of over 10,000 consumers from five continents found that 85 percent of consumers had made minor to significant changes in their purchasing based on sustainability preferences and a 2021 study in the United Kingdom found that customers generally prefer circular products over non-circular products (Shikha et al. 2021; Boyer et al. 2021). Multinational corporations have adopted circular manufacturing commitments,[451] including around product design and materials, energy efficiency, and product recycling,[452] or material recovery.[453] Additionally, numerous manufacturing sectors are

pursuing circularity in Europe, including cement, plastics, wood products, textiles, and agriculture (CEM Bureau 2016; Selvan et al. 2023).[454] [455] [456]

NATIONAL

There is growing recognition of circular manufacturing as an opportunity from the federal government and US based companies. The potential for developing battery manufacturing, critical minerals recycling, and biomanufacturing was specifically noted in a July 2023 White House statement about advancing a circular economy.[457] A National Strategy for Advanced Manufacturing from the Executive Office of the President includes circular methods as a path to achieving sustainable manufacturing and recycling objectives (NSTC 2022). Explicit support for circular manufacturing is also notable in several agencies across the federal government. For example, the Environmental Protection Agency (EPA) emphasizes the need to capture waste and re-use it during manufacturing processes[458] and the Advanced Material and Manufacturing Technologies Office under the Department of Energy (DOE) is advancing circular manufacturing systems by developing reverse supply chain logistics and recycling technology.[459] Between 2022 and 2026 the federal government is investing $275 million in recycling infrastructure—its largest recycling investment in 30 years.[460] Additionally, the United States Department of Agriculture's National Institute of Food and Agriculture launched the Bioproduct Pilot Program under the Infrastructure Investment and Jobs Act (IIJA) to support the sustainable bioproduct manufacturing industry.[461] Bioproducts are generally understood to be materials or products made from renewable biological material; this could include familiar materials like lumber, or newer products like plant-based, certified compostable goods[462] or building materials like hempcrete (Barbhuiya and Bhusan Das 2022).[463]

The sentiment to increase the longevity of manufactured products is also reflected in the Right to Repair 2023 legislation, put forth by the National Conferences of State Legislatures with the intent for it to be taken up by states across the US. If taken up, it would require manufacturers to better equip consumers to independently repair the products they own. Four states enacted Right to Repair legislation in 2023 (including California) and thirty-three states and Puerto Rico considered it during the 2023 legislative season.[464]

In the private sector, sustainability and supply chain resilience are top priorities among US manufacturers, according to an annual survey by the Manufacturing Leadership Council.[465] Another survey of 300 executives of American companies found that 62 percent plan to move toward a more circular business model.[466] Private circular manufacturing consultants actively advise companies on circular transitions, and life cycle assessment consultants work with companies to develop resource efficient products and processes.[467] [468] Some are already investing in this transition. For example, a

number of private entities are investing heavily in anaerobic digestion to turn organic waste into energy.[469]

REGIONAL/LOCAL

California has passed several laws that have created an enabling environment for circular manufacturing. Since 2003, the Electronic Waste Recycling Act has provided an avenue for Californians to recycle their unwanted electronics at no cost.[470] More recently, a package of recycling and waste-related bills was signed into law to improve the quality of the state's organics and recycling streams, including the Plastic Pollution Prevention and Packaging Producer Responsibility Act which requires all packaging to be recyclable or compostable by 2032.[471] California became the third state to pass and sign an electronics Right-to-Repair Act in October 2023 to make it easier for owners to repair their devices and increase their longevity.[472] The Buy Clean California Act (BCCA) targets reductions in carbon emissions associated with manufacturing materials used in public works projects.[473] CalRecycle offers recycling for a range of products including batteries and e-waste and encourages manufacturers to make products from recovered materials (Henigan and Machi Wagoner 2021).[474]

Specific to clothing, 54 percent of surveyed California consumers said they anticipate buying more clothes made with recycled materials; some Californians are also willing to pay a premium for them.[475] In line with this trend, a pilot project in Los Angeles called Upcycle Now is attempting to demonstrate the potential of upcycling textile scraps and is working toward developing a "textile hub" where upcycled textiles could be received, repurposed, and distributed.[476]

Circular manufacturing is also present in the Central San Joaquin Valley. For example, in the biomanufacturing realm, BEAM Circular is exploring how to transform food system waste such as trimmings and nut shells into building materials, renewable energy, industrial chemicals, and consumer goods;[477] and Gallo Glass purchases and uses more than 30 percent of all glass recycled in California to make its wine and liquor bottles.[478]

Opportunities and Considerations

The combination of national imperatives and funding for circular-aligned practices, California legislation to strengthen waste management, and the strong manufacturing industry already present in the region[479] create a supportive environment for the Valley CERF region to advance—if not lead—on circular manufacturing. But pursuing circular manufacturing requires considerations related to up-front financial investments; ensuring fair wages, worker safety and well-being, and other aspects of

job quality; and minimizing—if not avoiding—possible unintended consequences of advancing new technologies.

OPPORTUNITIES

- **Invest in regional capacity to manufacture agricultural byproducts.** The Valley CERF region has agricultural waste and a strong manufacturing sector, but an industry expert noted that advancements in bioengineering sciences have outpaced their market commercialization (CVCF 2023). This presents an opportunity for the Valley CERF region to develop the region's manufacturing capacity for bio-based products that could utilize the regions' agricultural waste and by-products and create manufacturing jobs. Doing so offers an alternative to burning agricultural waste, which will be banned in California by 2025, as well as a pathway for meeting organics diversion requirements in the state .[480] [481] [482] Further, federal funding for biotechnology and manufacturing and an "Executive Order on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy" point to opportunities to invest in circular technologies and bio-based manufacturing.[483] [484]
- **Foster innovation in product design and business models.** There are a variety of manufacturing sectors in the Valley CERF region, including food and beverages, machinery, cement, plastics, wood products, glass, and textiles, among others, which are all relevant in a circular manufacturing industry cluster.[485] Supporting the region's existing businesses to design and manufacture their goods with circular principles could not only save resources and costs but also develop new markets with consumers who increasingly consider sustainability in their purchasing decisions. Business development efforts could help new circular manufacturing businesses in the region, and business attraction efforts could be used to bring in circular manufacturing businesses.

  Further, leveraging the region's state supported innovation hubs can support the research and development of the technologies, designs, processes, and machinery that support circular manufacturing. These hubs may include business accelerators, incubators, and training programs such as those sponsored by the Water, Energy, and Technology (WET) Center at California State University, Fresno;[486] those out of the University of California Riverside where there is an Opportunities to Advance Sustainability, Innovation, and Social Inclusion (OASIS) Innovation Hub; and the ExCITE incubator which supports business start-ups.[487] [488]
- **Strengthen digital and logistical infrastructure to track resources and coordinate supply chains.** The Valley CERF region has a strong manufacturing network via the San Joaquin Valley Manufacturers Alliance, which represents approximately 1,500 manufacturers and

training providers in the eight-county San Joaquin Valley region.[489] The region is also a logistics hub because of its major trucking industry for food export (CVCF 2023). Investment in logistics infrastructure to facilitate resources movement, such as through a resources marketplace, could simplify exchanges between industry actors that can use others' byproducts in their supply chains (Kumar et al. 2019).[490]

CONSIDERATIONS

- **Significant upfront investment in infrastructure and technology is necessary.** Developing the capacity to transform organic, electronic, and other "waste" into higher value products will require significant upfront investment (Kumar et al. 2019). While the science to re-use agriculture bioproducts is understood, the manufacturing technologies used in the bioeconomy have traditionally relied on a limited set of feedstocks such as corn, according to an interviewee. Therefore, investment in research and development of specific manufacturing technologies that support the diverse supply of organic materials in the Valley CERF region will be necessary and will likely require securing federal, state, and philanthropic funds to pursue these developments.
- **Continued improvements in wages, worker safety and well-being, and other aspects of job quality are needed.** Although by averages, most of the region's manufacturing sectors pay more than the region's 2-bedroom housing wage (see Appendix Table 5),[491] given the high rates of poverty in the region, increasing manufacturing wages still should be a priority. Additionally, expanding recycling, repair, and re-use activities support the success of a circular manufacturing industry cluster; but jobs in waste management tend to be low paying with unpleasant working conditions, and unregulated materials recycling such as e-waste has been associated with adverse health effects (Forti et al. 2020). Local research partners could help fill the need for more research on safety in waste-handling and circular manufacturing, which can ensure that as circular manufacturing practices are pursued and new facilities are constructed, they are designed, built, and operated in ways that ensure worker safety (Podder 2018; Wegmhann 2020). Beyond wages and safety, other aspects of job quality such as career opportunities, insurance, and retirement benefits should be considerations.
- **Unintended consequences of advancing biofuels.** According to an expert interviewee, advances in technologies that turn agricultural byproducts into energy could have unintended consequences. For example, they could unintentionally encourage farmers to grow crops to be used exclusively for biofuels, which would divert land from food production, damage biodiversity, and exacerbate water quantity and quality challenges.[492] Further, without the

right technologies, biofuels emit greenhouse gases, which are driving climate change.[493] It will also be necessary to ensure that biomanufacturing technologies can utilize diverse sources of organic matter available in the Valley CERF region. Meanwhile, a recent debate in the region centers around whether supporting dairy producers to capture cow manure and burn it as energy using biodigesters could create perverse incentives to increase animal farming which would also increase methane generation in the region.[494]

Policies and Other Levers

California's policies to reduce emissions and waste provide a foundation for circular manufacturing in the Valley CERF region but other policies that enable, encourage, require, and reward circular manufacturing practices and collaborative bodies are necessary to encourage more uptake (see Circular Economy chapter for more information).[495]

ENABLING

- **Waste accountability policies.** Zero waste and other waste accountability policies activate private companies to responsibly reduce and divert their "waste," according to an expert interviewee. Measures to discourage undesirable behavior can include fees on waste that goes to landfills; measures to encourage desired behavior can include tax breaks for waste that is diverted through composting, recycling, re-use, or repair (Ellen MacArthur Foundation 2013; Schröder and Raes 2021); often, incentives can be paired for stronger effect. If incentives are used to discourage poor waste management and encourage circular-aligned waste management in the private sector, they may become more motivated to identify new ways to generate higher and better uses for their byproducts (Blair and Mataraarachchi 2021). California is already working toward a zero-waste policy, which creates the opportunity for the Valley CERF region to be a state leader in waste diversion (Petek 2023).
- **Procurement policy.** Procurement policies can be leveraged to prioritize the purchase of goods manufactured using circular practices (Lingerard and Oelreich 2023).
- **Investment in supply chain transparency.** Supply chain assessments and efficiency certifications that verify the resource efficiency of a supply chain can help market circularly manufactured products, according to an expert. [496] Furthermore, open databases that track resource flows could support waste recovery, resource distributions, and transactions across manufacturers (Ellen MacArthur Foundation 2013).

- **Workforce training and technical assistance.** Specialized workforce training will be necessary to support career pathways in the biomanufacturing industry, according to an expert; to support equity, these efforts can focus on disadvantaged populations. Further, special attention to safety training and operations for new roles in waste management and manufacturing will be necessary to ensure the well-being of circular manufacturing employees (Weghman 2020). Uptake of circular practices by existing and start-up manufacturing businesses can also be enabled by technical assistance and incubation to help ramp up new technologies and operations.[497]
- **Grants and creative financing.** Necessary elements of circular manufacturing, including facility upgrades and retrofits as well as new business modeling, can be supported by grants, loans, or creative financing mechanisms. Creative financing to encourage and de-risk new business models and circular manufacturing solutions can range from green bonds, loan guarantee funds, taxes or tax breaks, and public-private blended finance approaches (Global Infrastructure Hub 2021; Schröder and Raes 2021).

CONSTRAINING

- **Industry non-collaboration.** In a survey of 63 manufacturing companies in the United Kingdom and the European Union, the most commonly cited barrier to implementing a circular manufacturing model was the "lack of appropriate partners in the supply chain." Communication and coordination across businesses can be challenging but are necessary to ensure consistent flows of resource inputs for manufacturing needs (Kumar et al. 2019).
- **Cost of upgrades.** Upgrading or retrofitting manufacturing facilities to capture byproducts and/or transform them into new products requires substantial upfront investment (Global Infrastructure Hub 2021). This could be challenging to secure, and uncertainty in future markets sometimes makes it difficult for business owners to defend such large investments (Armstrong et al. 2023).
- **Difficulties in impact assessment.** A circular economy expert noted that new jobs can be difficult to assess. More research is needed from more sources on the breadth and depth of benefits of circular practice (see Circular Economy fact sheet).

BOX J.2

Example: BioMADE and the Biomanufactuing Movement

BioMADE is a member organization with a vision to build a domestic bioindustrial manufacturing ecosystem.[498] BioMade has over 200 members from the industry, academia, and nonprofit sectors. They are currently supporting 27 technology and innovation projects, including development of a technology that will convert waste-based feedstocks into Vitamin A, and a project to turn methane into biodegradable plastic. BEAM Circular is a non-profit member organization of BioMADE that aims to expand the bioindustrial manufacturing sector in the Central San Joaquin Valley. They are working toward capturing the value of agricultural byproducts such as trimmings and nut shells by transforming them into new products including building materials, renewable energy, industrial chemicals, and consumer goods.[499]

Interplays: Economic Frameworks and Industry Clusters

As described in the Regional Plan Part 1 (CVCF 2023), the Valley CERF region experiences several interdependent and compounding economic, social, and environmental challenges, all of which are disproportionally experienced by the region's low-income communities and communities of color, who make up a significant proportion of the region's population. Structural and interconnected challenges and disparities, such as those in the Valley CERF region, are best addressed with structural and interconnected solutions. CERF's explicit goals for economic competitiveness and resilience, equity, and climate action, especially when contextualized with other actions taken by the state's leadership, appear to acknowledge that continuing with 'business as usual' is no longer an option. Thus, the opportunity CERF poses for the Central San Joaquin Valley—a region that plays a critical role in a state that itself is a strong part of the global economy—is to pair one or more of the economic frameworks (wholesale or in parts) and one or more of the industry clusters presented to accelerate and expand action across the public and private sectors. Indeed, the full extent of the economic, equity, and climate and environmental goals outlined in CERF cannot not be broadly met in the region—nor for any of the industry clusters presented—without the adoption of principles from the economic frameworks presented. This section introduces some of the many interplays across and between the economic frameworks and industry clusters:

- Each of the economic frameworks interact and overlap with each other in a variety of ways and to differing degrees, but also vary in the degree to which they balance the three CERF pillars. This invites Valley CERF to see the principles of each of the six economic frameworks as a menu to learn from and apply in place. For example, the principles of the cooperative economy espouse local ownership, local and ethical sourcing, and economic democracy, which correlate strongly to principles espoused in the local, triple bottom line, and fair trade economic frameworks. In another example, the principles of the triple bottom line economy espouse a whole system approach and orientation towards economic development instead of growth, with equal weight on positive outcomes for the economy as well as for people and planet, which has alignments with how a Doughnut economy is framed. Practices aligned with circular, cooperative, and fair trade economies offer strategies to advance goals outlined in the triple bottom line and Doughnut economic frameworks.
- Each of the industry clusters also interact, overlap, and amplify each other in a variety of ways and to differing degrees. While the industry clusters are not dependent on each other, their complementary nature invites Valley CERF to explore ways to strengthen one cluster with another. For example, responsible food systems and circular manufacturing both put attention

on limiting—and responsibly managing—the excess and byproducts that result from production. As discussed in the report, organic agricultural excess and byproducts can be inputs in circular manufacturing. These excesses and byproducts can also support a clean energy industry cluster. In another example, One Water puts significant attention on the land-water relationship, which is also present in responsible food systems, particularly in the context of regenerative agriculture.

- The economic frameworks and industry clusters are mutually beneficial, reinforcing the importance of pairing them in the Valley CERF region. For example, triple bottom line, circular, and fair trade economic principles are inherent elements of a responsible food system. Reciprocally, triple bottom line, cooperatively owned, and Fairtrade certified businesses have prevalence in the food industry. Further, some of the benefits promised in the industry clusters are not possible without the principles of one or more economic frameworks. For example, while clean energy, One Water, and circular manufacturing all offer proven and promising benefits for global- to local-scale climate action and environmental health, the extent of their promise for economic and equity outcomes—such as benefitting a diverse local workforce, diverse local businesses, and environmental justice—will not be fully achieved without embedding principles from one or more of the six economic frameworks. Further, while industry clusters can focus on providing products and services locally, exporting them, or a mix, the success of any industry cluster is dependent on a robust local network of varied but related businesses; the more businesses in this network that are locally owned, the more local economic benefit can be expected.
- The economic frameworks and industries each acknowledge—and benefit from—regionality and a cooperative relationship between urban and rural areas. For example, local is often defined by a distance radius instead of geographic or political boundaries because—as seen clearly in energy, food, water, and manufacturing—the source is often necessarily at some distance from the end consumer. For a finer point, it would be challenging for Fresno, an urbanized area, to manage its land uses in such a way that would enable sufficient space for all of its necessary energy, food, water, and consumables to be produced with city limits. Further, expanding any of these industries into a robust industry cluster also demands a regional approach. For example, One Water inherently demands a collaborative approach that responds to the watershed, not city or county lines, and thus needs upstream and downstream partners in planning and implementation. Further, with a clear watershed-wide strategy supported by meaningful investments, companies providing products (such as native plant nurseries and land care materials suppliers; manufacturers and/or distributors of pipes and pipe fittings, aggregate, filtration devices and other technologies, and equipment for facilities and in the field) and services (such as land planning, surveying, engineering, design, construction, operations and maintenance, monitoring and testing services) can all cluster with the water utility, local workforce development providers, and colleges and universities, to meet the needs of both public and private customers and other stakeholders.

The interactions and overlaps between the economic frameworks and industry clusters, as well as the mix of aligned proven and promising benefits and complimentary policies and other levers, invite Valley CERF to consider which economic frameworks or principles support the kind of regional transformation its aiming for; which industry cluster or clusters have the strongest potential given CERF goals and regional context; how to best pair the economic frameworks or principles with an industry cluster or clusters; what scale and degree of systems change its aiming for; and what the collective appetite is for adopting proven versus innovative approaches.

Appendix

Industry Cluster Analysis

In this section we rely on available public data sources to assess the size and scale of the clean energy, food, water, and manufacturing industries in the Valley CERF region. For each industry cluster we identify relevant industry sectors, estimate the number of relevant employees and businesses within the region, assess the size of businesses within each sector, and estimate annual wages. Data and other limitations for each industry cluster vary and are described with each subsection.

Size and Scale of Clean Energy Industry in Central San Joaquin Valley

For the purposes of data analysis, given limits with the data and data sources, we needed to break Clean Energy into four different sectors: renewable energy, energy efficiency, grid and storage, and clean vehicles. Note that this is a different organization than the six listed in Clean Energy chapter, which were renewable energy, energy efficiency, clean vehicles, transmission and distribution, storage, and grid modernization.

- **Renewable Energy** includes jobs and establishments that are engaged in renewable energy production such as wind and solar.
- **Energy Efficiency** includes jobs and establishments that relate to the design, production, trade, installation, and repair of products that increase energy efficiency (DOE 2023).
- **Grid and Storage** includes activities related to electricity storage and distribution, such as jobs in energy storage, smart grids, microgrids, other grid modernization, and establishments in electric power distribution.
- **Clean Vehicles** includes activities related to the manufacturing, wholesale trade, repair, and maintenance of clean vehicles.[500] Clean vehicles include electric vehicles, hybrid electric vehicles, plug-in hybrid vehicles, and hydrogen and fuel-cell vehicles.[501]

APPENDIX BOX 1

Data and Methods for the Clean Energy Industry Cluster in the Valley CERF region

This section uses data from two major sources:

- **Clean Jobs America Report (2023).** These data are based on E2's analysis of the 2023 U.S. Energy and Employment Report (USEER) data.
- **County Business Patterns (2021).** Produced by the US Census Bureau, County Business Patterns Data provides annual subnational economic data for establishments with paid employees by industry and employment size.[1] Data were downloaded for Fresno County, Kings County, Madera County, and Tulare County.

To assess the size and scale of a foundation for a clean energy industry cluster in the region, we estimated the size and scale of the current clean energy industry. Data on the number of clean energy jobs is from E2's Clean Jobs America 2023 report, at the county level. These data are based on E2's analysis of the 2023 U.S. Energy and Employment Report (USEER) data. E2's analysis takes USEER's report, which includes all energy jobs, and narrows the focus to only include clean energy jobs.[502] E2 data include jobs from a variety of clean energy sectors, but do not include jobs where individuals do not spend most of their time on clean energy-related activities. This may undercount employees who spend part of their time on clean energy-related work. It also only reports jobs that are directly related to clean energy, so it may not capture other contributing jobs within the value chain. Overall, the numbers we present from the E2 analysis captures the current landscape of clean energy jobs, but may not reflect all the jobs that have the potential to contribute to a clean energy industry cluster in the future.

Using County Business Patterns from the US Census Bureau, we assigned North American Industry Classification System (NAICS) codes to each of the sectors listed above and summarized the number of establishments and annual payroll that corresponded with collapsed industry codes. Limitations with County Business Patterns data do not allow for separation of clean vehicles data from all other motor vehicles data; so, for part of this analysis, we needed to include all motor vehicle data, such as manufacturing, transit, and repair establishments. Therefore, establishments and annual wages are estimates.

The data source reports business' payroll as a whole, and thus reflects the sum of employee income for each business' unique mix of occupations and employee statuses (full and part time). Data on payroll can be used as a measure of business size. Here, for consistency with the rest of the report, we call payroll "annual wages" and also estimate "average annual wages" per employee in Appendix Table 1 by dividing payroll by the number of employees. This provides a very rough comparison of wages across the sectors within this industry cluster, and does not describe the range of wages from low to high.

Not all establishments were associated with data on business size (by number of employees), so establishment numbers presented in the tables do not always match the number of establishments represented in the figures for each industry.

FINDINGS

Currently, clean energy jobs overall make up a small portion of the overall Valley CERF region jobs. There are a total of 13,016 clean energy jobs in the Valley CERF region. Just under 2% of the region's nearly 700,000 jobs (CVCF 2023) are clean energy jobs. Fresno has the largest number of clean energy jobs, followed by Tulare (data not shown).

The largest share of the region's clean energy jobs is in the energy efficiency sector. When looking at employment in these industry sectors, the largest number of clean energy jobs are in the energy efficiency sector (7,019 jobs), followed by renewable generation (3,110 jobs) and clean vehicles (2,551 jobs) (see Appendix **Error! Reference source not found.**).[503] Significantly fewer clean energy jobs are in the storage and grid modernization sectors. From 2022 to 2023, the number of clean energy jobs grew 14 percent in Tulare County, 5.5 percent in Fresno County, 2.8 percent in Madera County, and less than 1 percent in Kings County (data not shown).

APPENDIX TABLE 1

Valley CERF Region's Clean Energy Jobs by Sector

	Sector				
	Renewable Gen.	Storage / Grid	Energy Efficiency	Clean Vehicles	Total Clean Energy Jobs
Valley CERF Region	3,110	336	7,019	2,551	13,016

Source: Clean Jobs America, E2 by County. 2023. https://cleanjobsamerica.e2.org/wp-content/uploads/2023/09/E2-2023-CJA-Tables-U.S.-Clean-Energy-Employment-by-county-all-data-sheet.pdf

Notes: Only Renewable Generation Jobs, Storage Grid Jobs, Energy Efficiency Jobs and Clean Vehicle Jobs are counted.
Renewable Energy includes jobs in solar; wind; geothermal; bioenergy; combined heat and power (CHP); non-woody biomass; low-impact hydropower, geothermal, hydrokinetic, advanced bio-fuels; and wave energy
Storage and Grid includes jobs in clean energy storage, smart grid, micro grid, other grid modernization
Energy Efficiency includes jobs in Energy STAR and other high efficiency appliances, energy efficient lighting, HVAC (Heating, Ventilation, and Cooling), renewable heating and cooling, and advanced building materials.
Clean Vehicles includes jobs in electric vehicles, hybrid electric vehicles, plug-in hybrid vehicles, and hydrogen and fuel-cell vehicles.

The largest number of clean energy-related establishments are in the energy efficiency sector. The sector with the largest total annual payroll is energy efficiency with a total of $650,580,000 followed by grid and storage (total annual payroll of $562,039,000) (see Appendix Table 2). Within this sector, the plumbing, heating, and air conditioning sectors have the highest number of establishments and employees (data not shown).

The highest average annual wages per employee are in grid and storage ($129,442 annually) and renewable energy ($124,674). Average annual pay per employees for energy efficiency is roughly half that of grid and storage and renewable energy ($63,561 annually). The lowest average annual pay per employee is in the motor vehicles sector ($47,052 annually). Overall, average wages in jobs related to the clean energy industry are above the Valley CERF 2-bedroom living wage of $21 per hour, which is equivalent to about $43,600 annually at full-time employment (CVCF 2023).

APPENDIX TABLE 2

Valley CERF Region's Clean Energy Related Establishments and Annual Wages by Sector

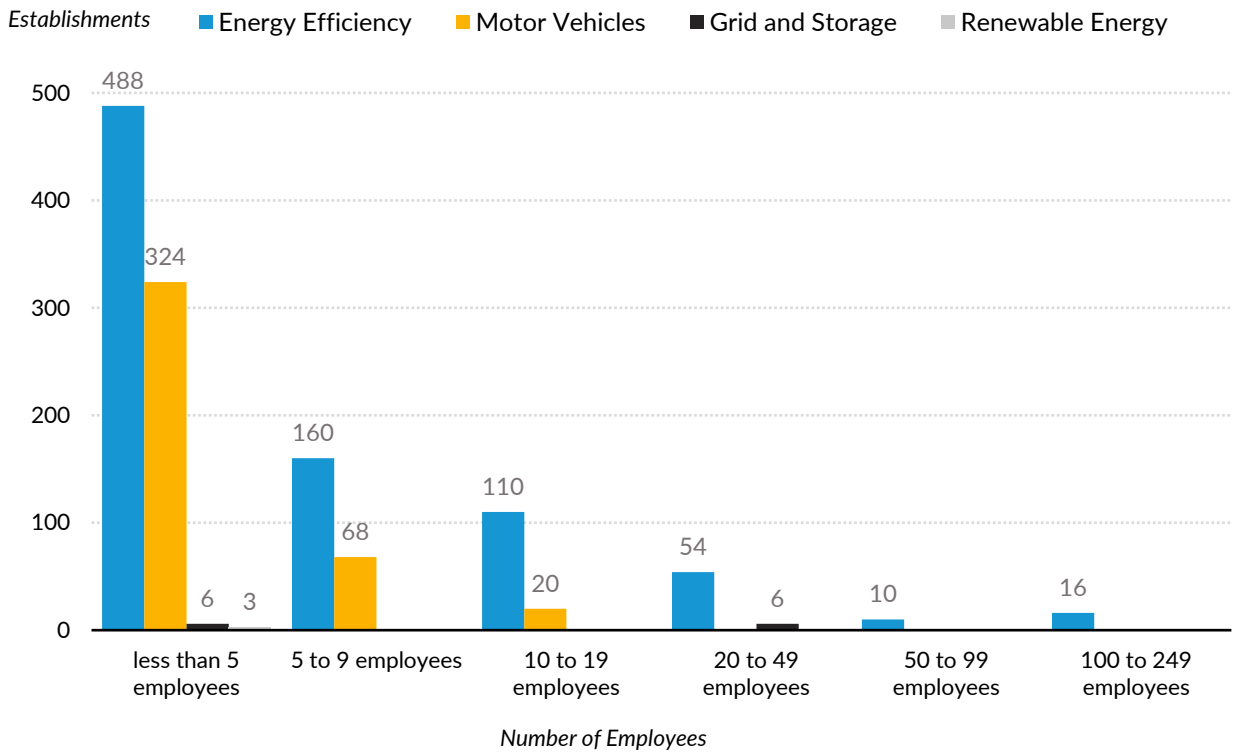
Industry	Number of establishments	Annual wages ($1,000)	Average annual wages per employee
Renewable Energy	7	$11,470	$124,674
Grid and Storage	46	$562,039	$129,442
Energy Efficiency	858	$650,580	$63,561
Motor Vehicles	446	$82,268	$47,052
Total	1,347	$1,306,357	$ 78,977

Source: United States Census Bureau. 2021. County Business Patterns. Data on self-employed individuals, employees of private households, railroad employees, agricultural production employees, and most government employees are excluded.
Notes: Six-digit North American Industry Classification System (NAICS) codes were used for the analysis.
Total average wages are calculated by dividing annual wages by the sum of employees for each sector using NAICS data; the NAICS employee data do not match E2's employee counts listed in Appendix Table 1, which were based on USEER data. Its unclear what is behind this discrepancy.
Renewable Energy includes: Hydroelectric power generation (221111), Solar electric power generation (221114)
Grid and Storage includes: Electric power distribution (221122), Power and communication line and related structures construction (237130),
Energy Efficiency: Plumbing, heating, and air-conditioning contractors (238220), Electrical apparatus and equipment, wiring supplies, and related equipment merchant wholesalers (423610), Warm air heating and air-conditioning equipment and supplies merchant wholesalers (423730)
Motor Vehicles includes: Motor vehicle electrical and electronic equipment manufacturing (336111), Bus and other motor vehicle transit systems (485113), General automotive repair (811111), Automotive exhaust system repair (811112), Automotive transmission repair (811113), Other automotive mechanical and electrical repair and maintenance (811118). Data limits the ability to narrow to clean vehicles only.
Sectors were selected if they are part of the clean energy industry or have the potential to be, however, this list is not comprehensive; there may be individual occupations or roles in other industries that can contribute to the clean energy industry, but are not captured by this section of industries.

The region's clean energy industry is led by small businesses. Most of the establishments related to the clean energy industry (97 percent) are small businesses with fewer than 50 employees; 90 percent have fewer than 20 employees (Appendix **Error! Reference source not found.**). Energy efficiency is the only sector which contains larger establishments.

APPENDIX FIGURE 1

Size of Valley CERF Clean Energy Industry-Related Establishments by Number of Employees



Source: United States Census Bureau. 2021. County Business Patterns. Data on self-employed individuals, employees of private households, railroad employees, agricultural production employees, and most government employees is excluded.
Notes: Establishment size by employee range was not available for all data. If fewer than 3 businesses in a category, the cell is suppressed, so the total number of establishments in this figure may not match what is listed in Appendix Table 2.

Size and Scale of the Food Industry Cluster in the Central San Joaquin Valley

We include six sectors in the food industry cluster: food production, food processing, food distribution, food wholesale and retail, food hospitality, and food waste and recovery.

- **Food production** refers to activities involved in growing food, including soil preparation, planting, cultivating, and harvesting crops; and is inclusive of related management and labor services.
- **Food processing** refers to post-harvest activities that prepare foods to go to markets. This might range from manufacturing dairy products, baked good, beverages, and other perishable and shelf-stable foods, as well as packaging products to prepare them to be sold by wholesalers or retailers.
- **Food distribution** refers to the movement of foods such as from producers to processors, from processors to suppliers, and from suppliers to consumers. It includes ground transportation only (local and long-distance freight trucking) as well as warehousing and storage for goods being moved.
- **Food wholesale and retail** refers to the sale of bulk and retail food products that food hospitality and food retail establishments or individual consumers purchase.
- **Food hospitality** refers to the service and sale of prepared meals, including by caterers; restaurants; drinking places; traveler accommodation such as hotels, casinos, and bed-and-breakfasts; and other establishments where prepared meals are sold (except for wineries and breweries which are included in processing).
- **Food waste and recovery** refers to activities that manage excess food, including diverting it from landfills by redistributing it to other consumers or large-scale composting, or through traditional solid waste management (landfill).

APPENDIX BOX 2

Data and Methods for the Food-Related Industries in the Valley CERF Region

This section uses data from two sources:

- **County Business Patterns (2021).** Produced by the US Census Bureau, County Business Patterns Data provides annual subnational economic data for establishments with paid employees by industry and employment size.[504] Data for Fresno County, Kings County, Madera County, and Tulare County were used.
- **California Labor Market Information by County (2021).** Produced by the State of California Employment Development Department.[505] "Current Industry Employment Statistics" for

"Total Farm" were downloaded from county profiles. We present peak employment data for each county.

To assess the size and scale of the foundation for a responsible food industry cluster in the region we estimated the size and scale of the current food industry cluster in the Valley CERF region. We used County Business Patterns data from the US Census Bureau, assigned North American Industry Classification System (NAICS) codes to each of the sectors listed above, and summarized the number of establishments, employees, and annual payrolls that corresponded with collapsed industry codes. We refer to "annual payroll" as "annual wages" throughout this document.

County Business Patterns data do not include data on self-employed individuals, employees of private households, agricultural production employees, and most government employees. Because no data exists, industry data on establishments, employees, and wages for food production and for food waste and recovery are likely undercounted. Further, there is no indication of what percentage of the region's large distribution industry (composed largely of trucking) is specifically focused on food, though it is likely substantial because of the region's large food export industry (CVCF 2023). Numbers of establishments in Appendix Table 3 do not match the number of establishments in Appendix Figure 2 because data on business size was not available for all establishments.

The data source reports business' payroll as a whole, and thus reflects the sum of employee income for each business' unique mix of occupations and employee statuses (full and part time). Data on payroll can be used as a measure of business size. Here, for consistency with the rest of the report, we call payroll "annual wages" and also estimate "average annual wages" per employee in Appendix Table 3 by dividing payroll by the number of employees. This provides a very rough comparison of wages across the sectors within this industry cluster, and does not describe the range of wages from high to low.

FINDINGS

Agricultural production employs the largest share of workers in the Valley CERF region's food economy. Although industry data is not available for agricultural production employees specifically in the County Business Patters data, labor market data from California's Employment Development Department indicates that employment in farming and ranching in the region is substantial, providing more than 106,000 jobs during peak season (see "Total Farm" and notes in Appendix Table 3). Some agricultural production-related jobs such as soil preparation, planting, cultivating, crop harvesting, and managing farm services and crews are included in the County Business Pattern data which further confirm the strong presence of agriculture in the region.

The food hospitality industry employs the second largest number of workers in the region's food economy and has the lowest employee wages. The food hospitality sector generated over $1.1 billion in aggregate employee wages in 2021 and provided nearly 46,000 jobs. However, based on available data, overall, the food hospitality sector provides the lowest average annual wages to its workers, who are paid an average of $24,543 annually—only 56 percent of what is earned in the next tier of jobs in the food industry (select production and wholesale/retail) and 45 percent of wages paid to workers in food processing. The hospitality sector's average wage is also only 56 percent of region's the 2-bedroom living wage, which is $21 per hour, or about $43,600 annually at full time employment (CVCF 2023).

Some food processing occurs in the Central San Joaquin Valley, but processing establishments represent a small share of total establishments. Based on available data for the Valley CERF region's food economy, the food processing industry provided the highest average employee wages in 2021 ($55,006). Despite food manufacturing already being the largest manufacturing sector in the region by employees and aggregate annual wages (Appendix Table 3), there is an opportunity to grow regional food processing to create more jobs with higher-than-average earnings for food industry workers.

APPENDIX TABLE 3

Valley CERF Region's Food Industry Cluster Employees, Establishments, and Aggregate Annual Wages by Sector

Sector	Number of Employees	Number of establishments	Annual wages ($1,000)	Average annual wages per employee
Total Farm[i]	106,400	NA	NA	NA
Select Production[ii]	5,075	246	$222,051	$43,754
Hospitality	45,707	2,834	$1,121,774	$24,543
Wholesale / Retail	20,536	1,142	$891,484	$43,411
Distribution	17,533	1,598	$805,660	$45,951
Processing	26,865	258	$1,477,725	$55,006
Waste/Recovery	NA	NA	NA	NA
Total	**217,041[iii]**	**6,078**	**$4,518,694**	**$39,049[iv]**

Sources:

[i]Employment Development Department. 2021. Labor Market Information by County.

[ii]United States Census Bureau. 2021. County Business Patterns (CBP). CBP data excludes on self-employed individuals, employees of private households, railroad employees, agricultural production employees, and most government employees.

Notes:

Labor Market Information by County data is for "Total Farm" employment. Raw data includes employees by month per county. The highest single-month employment value in 2021 (the peak employment) was used for each county.

Four, five, and six-digit North American Industry Classification System (NAICS) codes were used for the analysis.

Annual wages (payroll) are reported in thousands of dollars.

[iii]The "Total" figure for employees includes "Total Farm" but does not include "Select Production" to avoid duplication.

[iv]Total average wages are calculated by dividing annual wages by the sum of employees for "Select Production", "Hospitality", "Wholesale / Retail" and "Processing".

There is uncertainty around what percentage of some of the sectors in the table are specifically focused on food. Given this uncertainty around the total size of the food industry, we do not present sectors as a percentage of the total food industry.

Although the County Business Data excludes agricultural *production* jobs, we account for the following production-related industries: Soil Preparation, Planting, and Cultivating; Support Activities for Crop Production; Support Activities for Animal Production; Crop Harvesting; Farm Labor Contractors and Crew Leaders; and Farm Management Services. The processing category does not include jobs related to the production of agricultural inputs like fertilizers and irrigation. The County Business Patters source does not include data on: Aquaculture; Cattle Ranching and Farming; Fruit and Tree Nut Farming; Hog and Pig Farming; Oilseed and Grain Farming; Other Animal Production; Other Crop Farming; Poultry and Egg Production; Sheep and Goat Farming; Vegetable and Melon Farming.

Processing includes: Postharvest Crop Activities, Grain and Oilseed Milling, Sugar and Confectionary Product Manufacturing, Fruit and Vegetable Preservation and Specialty Food Manufacturing, Dairy Product Manufacturing, Animal Slaughtering and Processing, Seafood Product Preparation and Packaging, Bakeries and Tortilla Manufacturing, Other Food Manufacturing, and Beverage Manufacturing. Animal Food Manufacturing and Tobacco Manufacturing are not included.

Wholesale/Retail includes: Grocery and Related Product Merchant Wholesalers; Grocery and Convenience Retailers; Wine and Distilled Alcoholic Beverage Merchant Wholesalers; Farm Product Raw Material Merchant Wholesalers.

Hospitality includes Food Services and Drinking Places and Traveler Accommodation (Hotels, Casinos, Bed-and-Breakfast, All Other).

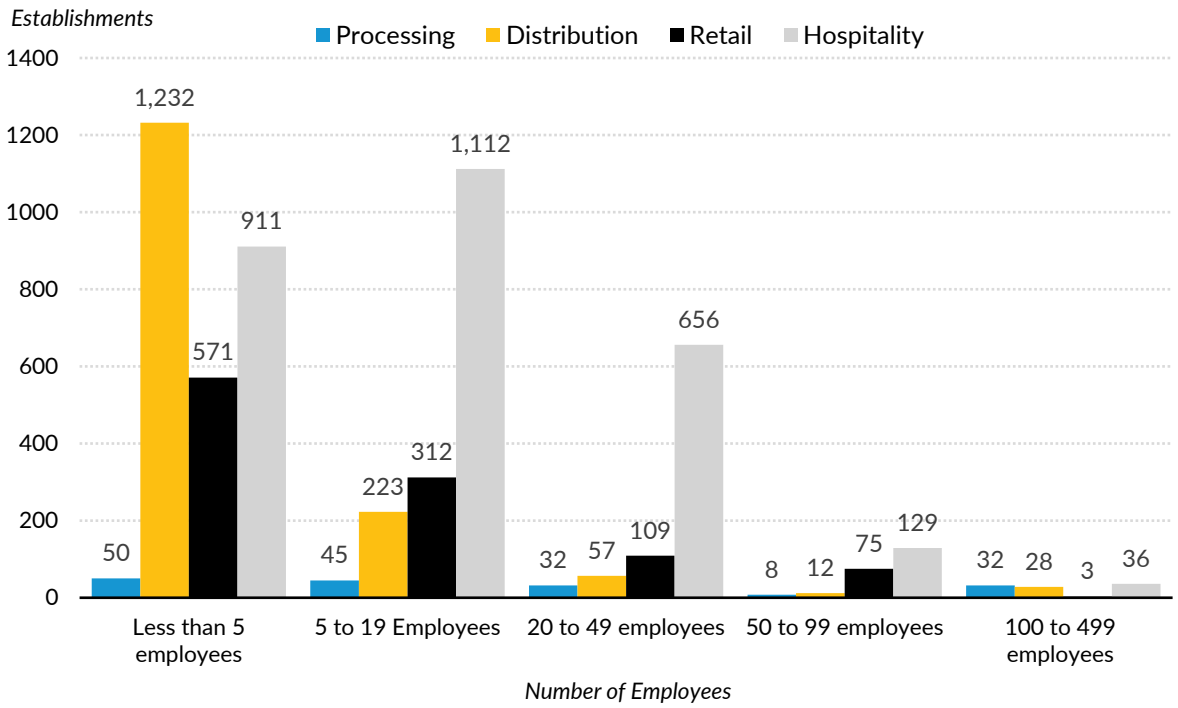
Distribution includes: General Freight Trucking, Local; General Freight Trucking, Long-Distance; Refrigerated Warehousing and Storage; Farm Product Warehousing and Storage.

Waste/Recovery activities for which we sought data included "Compost Manufacturing" but the data does not exist. There are, however, known composting and anaerobic digestion facilities in the region (CVCF 2023).

Most food-related establishments in the Central San Joaquin Valley are small, with fewer than 20 employees. A large majority of distribution establishments had fewer than five employees in 2021, but there are some with over 100 employees. The hospitality sector also had many establishments with fewer than five employees, but more were in the 5 to 19 employee range. Additionally, although there were more than 650 hospitality businesses with up to 49 employees, the hospitality sector had the most businesses with more than 50 employees (over 150 of them) (Appendix Figure 2). All but three food retail businesses and four food processing businesses had fewer than 100 employees.

APPENDIX FIGURE 2

Size of Establishments in Valley CERF Region's Food Economy by Number of Employees



Source: United States Census Bureau. 2021. County Business Patterns (CBP).

Notes: Establishment size by employee range was not available for all data. CBP excludes data on self-employed individuals, employees of private households, railroad employees, agricultural production employees, and most government employees. Food Production and Food Waste and Recovery are not included in this figure because the data do not exist.

Size and Scale of the Water-Related Industry Cluster in the Central San Joaquin Valley

We include six main sectors in a water industry cluster. Described in the context of a water industry cluster, they are:

- **Planning and Administration** refers to activities related to planning water infrastructure upgrades, regulating water in all its forms, and related administrations.
- **Siting** refers to technical surveying and mapping activities required for siting infrastructure.
- **Design** refers to activities related to landscape architecture, engineering, and industrial design.
- **Materials** refers to activities related to the production and supply of material inputs necessary for gray and green water infrastructure construction, including cement; gravel and other aggregate; pipes; valves; trees, native plants, and soil.
- **Building and construction** refers to water infrastructure-related construction and the equipment needed for construction.
- **Operations** refers to operations and maintenance activities involved in water system functioning.

APPENDIX BOX 3

Data and Methods for the Water-Related Industry Cluster in the Valley CERF Region

This section uses data from one source:

- **County Business Patterns (2021).** Produced by the US Census Bureau, County Business Patterns Data provides annual subnational economic data for establishments with paid employees by industry and employment size.[1] Data for Fresno County, Kings County, Madera County, and Tulare County were used.

To assess the size and scale of a foundation for a One Water industry cluster in the region, we estimated the size and scale of the current water-related industry. Using County Business Patterns from the US Census Bureau, we assigned North American Industry Classification System (NAICS) codes to each of the sectors listed above and summarized the number of establishments, employees, and annual payroll that corresponded with collapsed industry codes. We refer to "annual pay" as "annual wages" throughout.

County Business Patterns data do not include data on self-employed individuals, employees of private households, and most government employees, so there is likely an undercount of workers, such as those working for public water utilities. In addition, several of the categories including "Other Management Consulting Services," "Administrative Management and General Management Consulting Services," "Testing Laboratories and Services," and "Engineering Services" account for services that

may extend beyond water, and there is not a clear indicator of what percentage of jobs the water activities might represent in these sectors. Therefore, establishments, employees, and annual wages are estimates.

Numbers of establishments in Appendix Table 4 do not match the number of establishments in Appendix Figure 3 because data on business size was not available for all establishments.

The data source reports business' payroll as a whole, and thus reflects the sum of income for each business' unique mix of occupations and employee statuses (full and parttime). Data on payroll can be used as a measure of business size. Here, for consistency with the rest of the report, we call payroll "annual wages" and also estimate "average annual wages" per employee in Table 1 by dividing payroll by the number of employees. This provides a very rough comparison of wages across the sectors within this industry cluster, and does not describe the range of wages from high to low.

FINDINGS

A large building and construction industry plus a strong presence of design and planning firms in the Central San Joaquin Valley could support design and implementation of One Water management in the region. While it is not known how many of the region's 465 building and construction businesses (as of 2021 data) have all or part of their portfolio in water infrastructure-related construction, the capacity in the region is promising. Similarly, nearly 200 design firms—including landscape architecture services, engineering services, and industrial design services—and 1,860 planning and administration employees could support planning, design, and implementation of One Water management (Appendix Table 4).

Other necessary supports for One Water management, including operations, siting, and manufacturing and sale of construction materials are also present, but could be strengthened in the Central San Joaquin Valley. A workforce of 230 employees in water operations—including in water supply and sewage treatment facilities—is relatively small compared to the other sectors, which is not uncommon.[506] There appear to be only 3 establishments in the region that produce or sell some of the types of materials needed for certain water infrastructure, meaning much of this material may be manufactured and imported from elsewhere (Appendix Table 4). This presents an opportunity to increase the number of materials manufacturers, retailers, and wholesalers in the region.

APPENDIX TABLE 4

Valley CERF Region's Water-Industry Related Employees, Establishments, and Aggregate Annual Wages by Sector

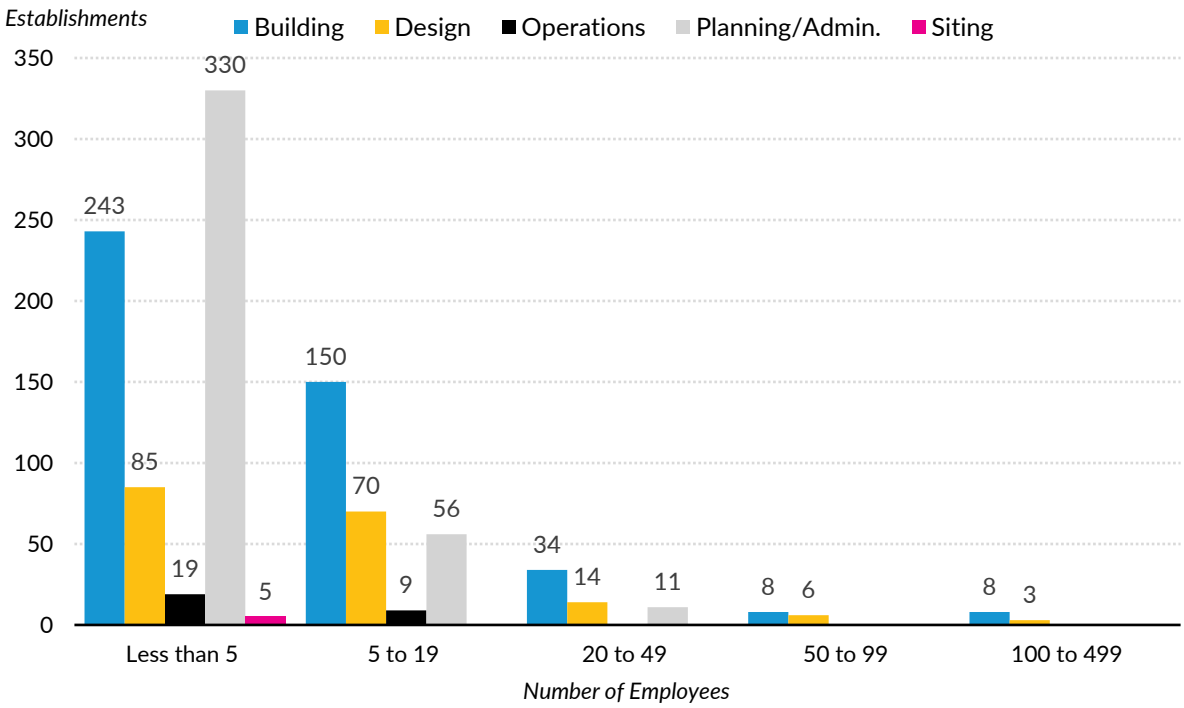
Sector	Number of employees	Number of establishments	Annual wages ($1,000)	Average annual wages per employee
Building and construction	6,198	465	$413,236	$66,672
Design	2,403	190	$195,852	$81,503
Planning / Admin.	1,860	425	$102,739	$55,236
Operations	230	34	$16,563	$72,013
Siting	74	15	$4,809	$64,986
Materials	52	3	$3,093	$59,481
Total	**10,817**	**1,132**	**$736,292**	**$68,068**

Source: United States Census Bureau. 2021. County Business Patterns (CBP). CBP data excludes self-employed individuals, employees of private households, railroad employees, agricultural production employees, and most government employees.
Notes: There is uncertainty around what percentage of some of the sectors in the table are specifically focused on water. Given this uncertainty around the total size of water-related industries, we do not present sectors as a percentage of the total water industry.
Four, five, and six-digit North American Industry Classification System (NAICS) codes were used for the analysis.
Building includes: Water and Sewer Line and Related Structures Construction, Other Heavy and Civil Engineering Construction, Plumbing, Heating, and Air-Conditioning Contractors.
Design includes: Landscape Architectural Services, Engineering Services, Industrial Design Services.
Planning / Admin. includes: Administration of Environmental Quality Programs, Regulation and Administration of Communications, Electric, Gas, and Other Utilities, Regulation, Licensing, and Inspection of Miscellaneous Commercial Sectors, Administration of Urban Planning and Community and Rural Development, Other Accounting Services, Environmental Consulting Services, Other Management Consulting Services, Administrative Management and General Management Consulting Services, Testing Laboratories and Services, Administration of Air and Water Resource and Solid Waste. All categories may account for establishments and jobs that are not specific to water.
Operations includes: Water Supply and Irrigation Systems, Sewage Treatment Facilities.
Siting includes: Geophysical Surveying and Mapping Services, Surveying and Mapping (except Geophysical) Services.
Materials include: Cement Manufacturing, Concrete Pipe Manufacturing, Industrial Valve Manufacturing, Other Metal Valve and Pipe Fitting Manufacturing, Nursery, Garden Center and Farm supply Retailers, Construction Sand and Gravel Mining.

Very few water-related businesses have more than 20 employees. Only the building and design sectors have business with 50 employees or more, but this accounts for only 2 percent of all establishments. Nearly half (42 percent) of all establishments have fewer than five employees (Appendix Figure 3). As such, smaller—likely local—businesses are important contributors to and beneficiaries of investments in a One Water approach, and subsequent industry cluster.

APPENDIX FIGURE 3

Size of Water-Industry Related Establishments in Valley CERF Region by Number of Employees



Source: United States Census Bureau. 2021. County Business Patterns.

Notes: Establishment size by employee range was not available for all data (CBP). CBP excludes data on self-employed individuals, employees of private households, railroad employees, agricultural production employees, and most government employees. There is no data on establishment size for the materials sector, but it can reasonably be assumed that all establishment have 50 or fewer employees given that there are only 52 employees in the sector across 3 establishments (per Appendix Table 4).

Size and Scale of the Manufacturing Industry in the Central San Joaquin Valley

We include all the manufacturing sectors in the manufacturing industry, and looked at three additional sectors that might be involved in a circular manufacturing industry cluster:

- **Manufacturing:** Includes all establishments that manufacture products.
- **Retail:** Includes select retail establishments that sell manufactured products with component parts.
- **Repair and Maintenance:** Includes establishments that repair and maintain manufactured products.
- **Waste:** Includes establishments that manage waste.

APPENDIX BOX 4

Data and Methods for the Manufacturing Industry in the Valley CERF Region

This section uses data from one source:

- **County Business Patterns (2021).** Produced by the US Census Bureau, County Business Patterns Data provides annual subnational economic data for establishments with paid employees by industry and employment size.[1] Data for Fresno County, Kings County, Madera County, and Tulare County were used.

To assess the size and scale of a foundation for a circular manufacturing industry cluster in the region, we estimated the size and scale of the current manufacturing industry. We also pulled data for select retail, repair, and waste management businesses to assess the presence of businesses in the region that could be supportive of a circular manufacturing industry cluster. Using County Business Patterns from the US Census Bureau, we summarized number of establishments, employees, and annual payroll data for all three-digit North American Industry Classification System (NAICS) codes in the manufacturing industry, select retail, repair, and waste management businesses. We refer to "annual payroll" as "annual wages" throughout. Due to limitations in the data, we were not able to assess the size of the waste management industry.

Numbers of establishments in Appendix Table 5 do not match the number of establishments in Appendix Figure 4 because data on business size was not available for all establishments.

The data source reports business' payroll as a whole, and thus reflects the sum of income for each business' unique mix of occupations and employee statuses (full and part time). Data on payroll can be used as a measure of business size. Here, for consistency with the rest of the report, we call payroll "annual wages" and also estimate "average annual wages" per employee in Appendix Table 5 by

dividing payroll by the number of employees. This provides a very rough comparison of wages across the sectors within this industry cluster, and does not describe the range of wages from high to low.

FINDINGS

Food and beverage manufacturing is the largest manufacturing sector in the in the Central San Joaquin Valley in terms of the number of people it employs, and the second in terms of the number of establishments. The food and beverage manufacturing sector also yields the highest aggregate annual wages at almost $1.5 billion, more than 3 times the next largest by aggregate annual wages and nearly 250 times that of the smallest by aggregate annual wages. Yet, there are four times as many jobs in food production as in processing (Appendix Table 5) meaning that, because of the dominant role of food production in the region, there could still be opportunities to grow the food manufacturing sector despite it already being the largest manufacturing sector in the region. Materials, machinery, and wood-related manufacturing are also notable in the region, collectively generating another $845 million (Appendix Table 5). The food, beverage, machinery, and wood-related manufacturing sectors are all very well positioned for circular manufacturing.

Within the manufacturing industry, fabric, textiles, and apparels manufacturing generates the lowest average employee pay in the Central San Joaquin Valley while petroleum and coal manufacturing generate the highest. The average wage of the highest paid sector (petroleum, coal) was more than three times higher than the average in the lowest paid sector (fabric, textiles and apparel). Despite those extremes, the average wage for most workers in manufacturing was in the low $50,000 to $60,000 dollar range (Appendix Table 5), which is higher than the region's two-bedroom living wage of $21 per hour, or about $43,600 with a full-time schedule (CVCF 2023). Therefore, creating manufacturing jobs generally presents an opportunity for growing well-paying jobs and, to the extent that circular manufacturing can generate a premium return on products, circular practices could help improve earnings in the lower-paying sectors and make them more attractive relative to jobs in petroleum and coal manufacturing, the latter of which do not align with CERF goals.

The Central San Joaquin Valley is home to auto, building materials, and equipment retailers, and repair and maintenance businesses, all of which could support a circular manufacturing industry cluster. Together, auto-related retail and repair businesses generated more than $680 million in annual wages and provided over 12,000 jobs in 2021. Equipment retail and machinery repair businesses provided over 1,000 jobs and generated over $50 million in annual wages. And electronics

retail and repair provided almost 900 jobs and over $41 million in annual wages. Other retail, including building materials, clothing, and furniture, are also present in the region, which together provide over 12,500 jobs and $356 million in annual wages (Appendix Table 6). Existing businesses in retail and repair in the region could adopt or expand take-back, repair, and refurbishment policies, practices, and services to facilitate movement toward a more circular economy in manufacturing sectors. Establishments in the waste industry can also support circular manufacturing practices, but data were not available for these establishments.

APPENDIX TABLE 5

Valley CERF Region's Manufacturing Employees, Establishments, and Aggregate Annual Wages by Sector

Sector	Number of employees	Number of establishments	Annual wages ($1,000)	Average annual wages per employee
Food, beverage	26,728	238	$1,484,703	$55,549
Materials	6,738	256	$415,592	$61,678
Machinery	3,845	83	$249,368	$64,855
Wood products	3,423	124	$200,235	$58,497
Metal materials	2,463	159	$132,425	$53,766
Transportation	1,402	36	$74,099	$52,852
Chemical	909	45	$69,390	$76,337
Computers, electronics, appliances	669	27	$36,338	$54,317
Fabric, textiles, apparel	174	13	$5,989	$34,420
Petroleum, coal	101	9	$11,266	$111,545
Total	**46,452**	**990**	**$2,679,405**	**$62,381**

Source: United States Census Bureau. 2021. County Business Patterns (CBP). CBP data excludes data on self-employed individuals, employees of private households, railroad employees, agricultural production employees, and most government employees.

Manufacturing businesses in the Valley CERF region are either fairly small or very large. About 60 percent the region's manufacturing businesses are small, employing between 20 and 49 people. The other 40 percent are large, employing 250 or more people (data not shown). Of the other businesses that could support a circular manufacturing industry cluster (i.e. repair businesses and retail businesses), nearly 75 percent are also smaller, employing between 20 and 49 people; less than 1 percent of these businesses have 250 employees or more (data not shown). This implies that investment in a circular manufacturing industry cluster in the region could be largely supported by –

and be mostly beneficial to – smaller businesses; it also indicates the importance of engaging the larger manufacturing employers in the Valley CERF region in circular practices.

APPENDIX TABLE 6

Valley CERF Region's Circular-Supportive Establishments, Employees, and Aggregate Annual Wages by Sector

Sector	Number of employees	Number of establishments	Annual wages ($1,000)	Average annual wages per employee
Select Retail				
Auto-related retail	8,069	556	$509,047	$63,087
Clothing retail	6,326	453	$127,195	$20,107
Building materials retail	5,004	203	$169,686	$33,910
Furniture retail	1,244	152	$58,929	$47,370
Electronics Retail	620	65	$22,638	$36,513
Equipment retail	610	69	$20,419	$33,474
Repair and Maintenance				
Auto repair	4,299	797	$171,267	$39,839
Machinery repair	640	107	$36,209	$56,577
Electronics repair	247	35	$14,714	$59,571
Household goods repair	169	42	$7,508	$44,426
Waste/Utilities				
NA	NA	NA	NA	NA

Source: United States Census Bureau. 2021. County Business Patterns (CBP). CBP data excludes data on self-employed individuals, employees of private households, railroad employees, agricultural production employees, and most government employees.

Notes: *Select Retail:* Includes Clothing Retail, Building Materials Retail, Furniture Retail, Electronics Retail, and Equipment Retail. *Repair and Maintenance:* Includes Automotive Repair and Maintenance, Electronic and Precision Equipment Repair and Maintenance, Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance, Personal and Household Goods Repair and Maintenance.

Data was not available in the County Business Patterns data for: Compost manufacturing; Biomass Electric Power Generation; Sewage Treatment Facilities.

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