# As We Lift All Boats:

## A Vision of Clean Technology Integration in the Transformative Climate Communities Program

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Empowering the residents of participating cities to become active members and stewards of a clean energy future is precisely the transformation we need.

By the end of 2017, California will embark on the first-of-its-kind Transformative Climate Communities (TCC) Program,[1] which will accelerate catalytic, transformational change in some of the state's most disadvantaged and polluted communities. Through this unprecedented investment, California's Strategic Growth Council (program's lead agency) will allocate $140 million in California Climate Investments[2] (cap-and-trade) funds to three locations (Fresno, Los Angeles and a third location to be determined) to achieve large-scale, holistic impacts on key communities and in areas of high need.[3]

The program's finalized guidelines were released in August 2017,[4] with project concept proposals due to the Strategic Growth Council mid-October. As stakeholders continue to assemble and prepare to embark on this pioneering program, the Center for Sustainable Energy® (CSE) provides this policy perspective, envisioning a TCC Program with rich energy planning activities and deeply integrated clean technologies. Empowering the residents of participating cities to become active members and stewards of a clean energy future is precisely the transformation we need.

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## Introduction

California remains the nation's guiding force with the most progressive greenhouse gas (GHG) emissions reduction goals and bold environmental justice policies. In an uncertain federal climate, the state remains poised to expand and accelerate its environmental and social stewardship through a diverse array of programs focused on building innovative, future-oriented smart infrastructure and communities. After extensive planning, substantial stakeholder engagement and complex program development, the Transformative Climate Communities (TCC) Program stands ready to continue California's leadership by initiating one of the state's most ambitious undertakings concentrating on support of disadvantaged communities (DACs).

## TCC Program: Driven by Catalytic Leadership

It is important to acknowledge and highlight how California actualized the TCC Program. Created in 2016 by a group of stakeholders including the Governor's Office of Planning and Research, the California Strategic Growth Council (SGC) and the legislature and supported by the 2016-17 Budget Act and Assembly Bill 2722,[5] the program's initial momentum successfully forged a path to an allocation of $140 million and established the foundation for the program's policy framework. Even in its early stages of development, it became clear that the TCC Program would become a tactical and targeted program focused on providing concentrated investments in California's DACs. Subsequent regulatory activities affirmed this by determining that funding would be distributed based on the highest thresholds of need,[6] which resulted in the prioritization of three DAC regions for the first round of funding:

- ▶ Fresno – $70 million
- ▶ Los Angeles – $35 million
- ▶ A third area – $35 million (to be determined)

Using a place-based approach, the TCC Program has been designed to make "comprehensive public investments" so that "private resources can be more effectively catalyzed to support transformation in DACs."[7] This innovative policy framework and approach will spark a wide variety of community-oriented activities, public-private partnerships, philanthropic opportunities and investment that will work in concert to initiate the program's intended change. In addition, this program will leverage innovative data, metrics and tracking methodology in the form of "indicators,"[8] to ensure program transparency that will inform the decision-making process. Concentrated funding, supported by robust programmatic impact metrics and program management will yield truly transformative activities and outcomes. This innovative design and approach shows the potential for tremendous success and will likely garner national—if not international—attention.

## Principles of TCC Program Clean Technology Integration

Based on the program's ability to accelerate innovative clean technology deployment—especially in support of California's most disadvantaged citizens—CSE has been active in the TCC Program policy discussion and an outspoken supporter of zero net energy (ZNE) integration strategies. From

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CSE's perspective, this is an ideal way to create results-driven, community-focused neighborhood transformation efforts that enable engagement across multiple sectors and provide a path to deep GHG emissions reduction practices. CSE also promotes the collection of data that will support evidence-based program assessments. In support of clean technology integration strategies, CSE has provided its perspective before SGC on multiple occasions, in January, March, April and August 2017, in response to SGC's iterative TCC Program Scoping Guidelines development. CSE provided this feedback to focus attention on the opportunity to build clean technology policy and ZNE principles into the program.

## Six Clean Technology Policy Principles

CSE provided its feedback under the umbrella of Six Clean Technology Policy Principles that focused on the empowerment of TCC Program residents and community members. Through the pursuit of these six principles, the TCC Program will be able to leverage clean technology as a tool to promote engagement, cultivate curiosity, empower residents and instill community-focused and environmentally focused values strongly aligned with the program's transformative objectives.

PRINCIPLE **1** **As interactive as possible.** This principle recognizes that the successful transition to the use of clean technology resources, especially distributed energy resources, requires hands-on experiences and a mindful focus on the advantages of change. These experiences should provide residents with the physical interaction of seeing, touching and otherwise using clean technologies. This interaction should be intuitive and spontaneous, but also driven and accelerated by targeted education and outreach (E&O) initiatives in languages appropriate to community residents and cultural norms. Whether in the form of plug-in electric vehicle (PEV) ride-and-drive campaigns;[9] technical, financial and education assistance via the Self-Generation Incentive Program (SGIP);[10] or consumer workshops, dedicated solar webpages, educational collateral and webinars,[11] CSE's expertise across broad E&O channels has showcased the deep value of group-targeted E&O as an accelerant to interactive, clean technology adoption.

PRINCIPLE **2** **As much as possible.** This principle focuses on maximizing clean energy technology access—a clean energy choice inundation tactic of sorts—in the TCC community. This strategy recognizes the value of focusing on mass exposure, creating widely available and seamlessly integrated clean technology into the TCC community members' lifestyles and daily practices. Clean technology proliferation will drive both business development opportunities and consumer adoption, comparable to widespread use of smartphones, which have seen success across all demographics and income levels.

PRINCIPLE **3** **As diverse as possible.** This principle focuses on multiple channels of clean technology delivery and dissemination— essentially a "menu of low- and zero-carbon choices"— which leverages the value in technology diversification to solve localized community needs and challenges, with wider touchpoints on regional and grid-level resiliency strategies consistent with statewide efforts and initiatives.[12]

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The TCC Program presents significant opportunities to build community-scale (and community-focused) clean technology education and learning centers, incubators and job and workforce training centers as well as platforms for thought leadership, where clean technology and knowledge acquisition can merge with educational and training experiences and activities.

PRINCIPLE **4**

**As early as possible.** This principle is essentially a youth-focused strategy that seeks to maximize exposure quickly and early, with the goal to create hands-on experiences that inspire individuals to learn more. Exposure to new ideas, environments, technologies and ecosystems supports a positive outlook and expands a sense of community environmental ownership. In this regard, the TCC Program presents significant opportunities to build community-scale (and community-focused) clean technology education and learning centers, incubators and job and workforce training centers as well as platforms for thought leadership, where clean technology and knowledge acquisition can merge with educational and training experiences and activities. These opportunities are invaluable tools to create paths of "ownership" to the clean technology resources in the TCC Program.

PRINCIPLE **5**

**As integrated as possible.** This principle focuses on seamless integration, maximizing clean technology assimilation into a community. Ironically, the most successful projects will go "unseen" by becoming quickly absorbed into the social and community landscape and practice. Painting this picture, schools and community centers will provide ideal clean technology integration hubs; solar photovoltaic (PV) canopies at affordable housing and in parks create ideal settings for community solar; TCC buildings can aesthetically display advanced energy storage (ES) systems; and readily available, fully accessible (public and private) plug-in electric vehicle (PEV) charging stations—everywhere—become the norm. In this vision, success is achieved when the student assumes all schools and centers have such technology, when affordable housing tenants assume all housing has similar capabilities and all residents understand the advantages and availability of PEV charging. When activated, the TCC Program facilitates "deep clean technology integration" activities and a testament to program success would be looking back from a transformed community and wondering how it all worked before.

PRINCIPLE **6**

**Savings and pocketbook-oriented investments.** This principle recognizes that our everyday choices can improve our planet while saving us money. TCC investments need to maintain focus on the end user's (TCC resident's) pocketbook with a concentrated focus on relating projects to savings. To support this, programs should remain aligned with efforts to manage and lower energy costs, compare electricity prices to gas prices, promote transportation efficiency practices that lead to measurable savings and encourage housing energy/water efficiency that reinforce energy use optimization. Effective management of these crucial resources leads to the resident's bottom line. Here, the TCC Program succeeds when clean technology integration has a positive economic impact on residents' pocketbooks, which can lead to any number of auxiliary benefits, including financial stabilization, better health, higher incomes and wealth building.

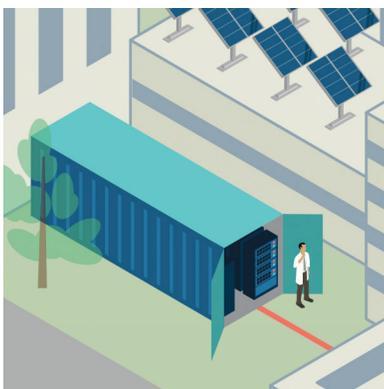# The Path to TCC Program Clean Technology Integration

To this point, we have discussed clean technology in the abstract. What are these clean technologies that present such opportunities for integration into the TCC Program? This section discusses a spectrum of clean technologies that are ideal for integration into the TCC Program ecosystem and highlights key policy activities that could facilitate their integration.

▶ **Solar photovoltaics (PV)** – Solar PV creates clean, renewable energy from the sun and promotes self-generation and self-empowerment. Solar PV provides abundant, sustainable, reliable energy with flexible, modern technology controls, that are ideal to power the TCC Program ecosystem. The TCC Program can integrate a wide range of solar PV, from "solar trees" in park areas as part of an urban heat island impact mitigation strategy to community-scale projects and utility-sized solar PV systems—the possibilities are somewhat endless. As a grid resource, solar PV can minimize the need for new energy infrastructure costs, such as transmission and distribution[13] while supporting a range of grid reliability and redundancy initiatives. It also is worth noting that a wide range of solar PV incentives are available for DACs and low-to-moderate income households that can be leveraged to promote solar PV adoption.
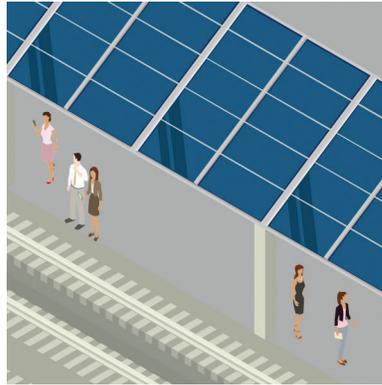
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▶ **Energy storage (ES)** – Energy storage is enormously dynamic and can be used to store the excess self-generation from solar PV and other energy overgeneration. When integrated into building systems, ES can be used for resiliency as well as a variety of energy efficiency management practices, or even off-grid applications. ES also can help with commercial needs by curtailing electricity demands and demand charges. Storage is inherently dynamic and can accept electricity from PEVs and be used to charge PEVs in various scenarios. In addition, transit rail has leveraged the power of this innovative technology via wayside energy storage, as the Los Angeles Metro system has done. It also is worth noting that the energy storage market is booming, having grown over 200% in 2015, which presents a workforce opportunity.[14] in addition, California prioritizes ES, and it is eligible for state incentives via the Self-Generation Incentive Program.[15]

▶ **Energy-efficient (EE) appliances and smart EE systems** – Smart EE appliances optimize performance across networked technologies and encourage technology adoption best practices among residents. EE supports the bottom line principle of managing and minimizing energy

usage, which in turn leads to household cost savings and improved economics.

▶ **Plug-in electric vehicle (PEV) deployment and charging infrastructure** – With a cost-per-mile that is essentially one-third of the equivalent cost of gasoline,[16] PEVs make an ideal investment for all income levels. Expansive PEV infrastructure will be able to support the TCC Program's low-to-moderate income households, who will greatly benefit from this lower and less volatile fuel cost—a significant driver of household expenditures. In the case that a PEV purchase or lease is not an option, shared-use options, such as car sharing, car rental, ride-sourcing and ride-sharing (via transportation network companies)—which can and should be operated using PEVs—will encourage TCC residents to explore the use of a diverse array of PEV transportation options. Moreover, the widespread presence of PEVs and PEV charging infrastructure in the TCC ecosystem will entice participation in PEV activities. High initial costs are a barrier that TCC will likely have to address, but the state has numerous examples of how to do this, including the CVRP.
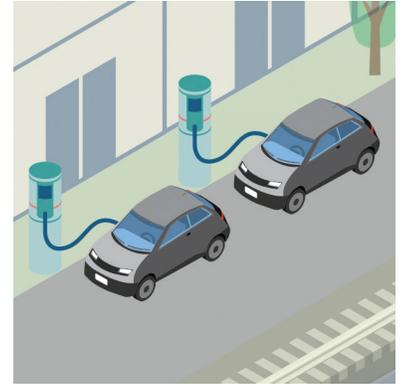
▶ **Transportation electrification** – The TCC Program is an ideal environment to test technologies and activities aligned with statewide transportation electrification (TE) policies. A wide range of policies are being implemented through a concerted, multiagency effort to actualize policies embodied in Senate Bill 350,[17] the ZEV (zero-emission vehicle) Action Plan,[18] Advanced Clean Transit (ACT),[19] California State Freight Action Plan[20] and many other policy areas. Notably, pursuant to SB 350, the California Public Utility Commission has allowed utilities to file TE pilots to support widespread TE in diverse market segments in the near term,[21] and state agencies are working in concert to implement a wide range of innovative initiatives.

▶ **Innovative intermodal solutions** – The TCC Program is an ideal environment to test innovative solutions focused on transit centers, which would promote connectivity and travel to and from highly trafficked areas. These practices may decrease total vehicle miles traveled (VMT) while simultaneously increasing the share of electric VMT, both contributing to decreased GHG and particulate matter emissions in these densely populated

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areas. In this regard the TCC Program could coordinate innovative transit activities in a variety of areas, including the following.

- PEV bus travel (i.e., public transit) with concentrated activity within the TCC project area
- Hydrogen fueling stations and infrastructure seamlessly located to encourage use by transit takers and public fleets
- Very low carbon, very high renewable energy electricity[22] pilots that promote the charging of vehicles from extremely clean electricity sources
- Electric bicycles (e-bikes) and electric scooters (e-scooters)[23] that are in and around station access points, with charging capability at these locations for these vehicles
- Overhead catenary line electrification along highly traveled freight and highways corridors[24]
- Off-road, maritime and aviation projects that feed into intermodal facilities and areas
- Light-, medium- and heavy-duty rail projects and intermodal rail hub development
- California high-speed rail station community initiatives,[25] which will prepare TCC Program project areas for future needs and expansion, while building the state's largest ZEV and zero net energy systems.[26]

## Policy Tools to Facilitate Clean Technology Adoption

This section focuses on three key tools crucial to supporting the successful implementation of the TCC Program: education and outreach, data management tools and incentives.

▶ **Education and outreach (E&O).** The deployment of this array of clean technology offerings will require an expansive E&O effort. Engaging in broad-based, consumer-focused E&O for all TCC residents allows for targeting of specific subpopulations and enables responsive and streamlined messaging. Also, using information gathered through this E&O, stakeholders can create usable, accessible and compelling material to inform TCC Program investment decision-making, including key performance metrics. CSE believes the E&O effort should take the form of ride-and-drive campaigns, technical and financial education and assistance, social media and dedicated webpages with interactive material, training and education collateral, as well as other avenues. Moreover, to ensure consistent messaging, this material should be in languages and cultural context appropriate to the TCC Program area. Fundamentally, the TCC Program should provide the ideal forum for targeted E&O activities that will entice program participation from residents, which will in turn fortify activities that support the program's success.

▶ **Data management tools.** Monitoring and tracking, as well as detailed data management, will be crucial activities in the TCC Program, as a well-organized, concerted and efficient collection of key program indicators will prominently display the TCC Program's public policy learnings and generate

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community interest. CSE's experience implementing a wide range of data-driven programs has found that in-depth data collection plans and practices that capture key public policy indicators to inform community-scale decision-making processes are crucial, as illustrated by the Equinox Project.[27] The Equinox Project has a robust history of regional engagement and cross-sector engagement, utilizing various partner organizations to collect data and provide local context around indicator areas. The Equinox Dashboard provides a snapshot of environmental and economic trends by measuring a diverse range of indicators.[28]

▷ **Incentives.** The TCC Program provides an ideal environment to test a diverse array of incentive strategies to encourage program participation. Through its experience administering the Clean Vehicle Rebate Project (CVRP), SGIP and the California Solar Initiative (CSI), CSE can attest to the value of providing consumer incentives to encourage clean technology adoption and promote consumer behavioral change. Such strategies could target the deployment of incentives that promote infill development and reduce vehicle miles traveled,[29] transit commuter incentives, shared-use mobility incentives and ZEV rebates, such as the CVRP and federal tax credit.[30] In addition, such strategies could provide financial incentives for qualified solar installations at multifamily affordable housing properties consistent with AB 693. Lastly, there is an abundance of stackable incentive options available to the TCC resident that can promote adoption of clean technologies across the TCC Program ecosystem.

## The Vision of the Transformative Climate Community Ecosystem

Through the integration of these six principles, the use of this diverse menu of clean technology offerings and the policy tools discussed, the TCC Program presents the unique opportunity to design, build, incubate, transform and accelerate catalytic change in participating communities. To visualize the TCC Program with these attributes, the following graphic (and online) depicts an idealized "transformed" community. This illustration provides insight into the capability for clean technology to be blended seamlessly into the TCC Program ecosystem—as an accelerant to community change.

It is worth noting that the "Vision of the Transformative Climate Community Ecosystem" as presented focuses on showcasing the in-depth interaction between clean technology programs, transportation systems, and infrastructure. However, TCC Program funding would not suffice to complete all aspects of the vision as illustrated, and the "clean technology layer" is only one layer of an overall urban planning strategy and experience, which would encompass many layers (e.g., the current layer is absent of landscaping, soils, water, and biodiversity and other related natural attributes). Even so, it is highly likely the TCC Program presents the ideal environment to plant the seeds of innovation necessary to actualize clean technology-focused TCC activities while encouraging private industry investment to take ownership of parts of the ecosystem. Though such practices, the TCC Program will become a beacon of change across these communities and regions.

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# The Vision of the
# Transformative Climate Community Ecosystem

1. Hydropower: Existing Resources/Capacity
2. Utility Wind Turbines
3. Utility-scale Solar
4. Renewable Biofuel/Biogas
5. Utility Substation
6. CHP Microturbine
7. Electrified Freight Corridors Fed by Solar PV and Storage
8. Clean Technology Jobs Center
9. Affordable, Multi-Unit Dwellings with Solar, Storage and PEV Charging
10. Publicly Accessible Curbside Charging
11. Workplace Electric Vehicle Charging
12. Thermal Energy Storage – Commercial
13. Self-Generation Incentive Program E&O
14. Solar – Commercial
15. Electrified Light Rail Lines
16. Energy Storage – Commercial
17. Fuel Cell – Commercial
18. Solar PV Education and Outreach (E&O)
19. Green Mobility Hub
20. Bicycles, E-Bikes and E-Scooters with Plug-in Charging
21. PEV Chargers and Hydrogen Fueling
22. Zero-emission Vehicle Test Drives
23. Electrified and Hydrogen Buses
24. DCFC Express Charger
25. Solar Tree Canopies
26. DC Fast Chargers
27. ZEV Taxis
28. Vehicle-grid Integration Pilots
29. Community Energy Storage
30. ZEV Car-sharing Programs
31. Distributed Wind – Residential
32. Geothermal Heat Pump – Residential
33. Fuel Cell – Residential
34. Solar PV in High-speed Rail Right-of-way
35. Innovation Incubator
36. Energy Storage – Residential
37. Electric Vehicle Charging – Residential
38. Smart Inverter
39. Community Shared Solar

# Policy Recommendations: The Steps to Actualizing the Clean Technology Transformative Climate Community Ecosystem

This section discusses nine primary policy strategies to actualize clean technology integration in the TCC Program.

**1) Leverage existing plans.** While the TCC Program will undertake innovative practices, it is not necessary to reinvent the wheel. Ample clean technology resources exist that can inform the design of the TCC Program's innovative undertakings, which will save time and resource allocation. These include but are not limited to the following items.

- The California Solar Permitting Guidebook[31]
- Regional PEV Readiness Plans[32]
- PEV Streamlined Permitting Guidance[33]
- Electric Vehicle Charging Station Installation Guidelines[34]
- U.S. Department of Transportation's Smart City Challenge Projects[35]
- Existing climate action plans, GHG reductions plans and sustainability plans[36]
- Many others

Notably, U.S. DOT Smart City efforts have leveraged an additional $500 million in private and public funding to help make their Smart City vision real.[37] As for PEV readiness plans, a recent Idaho National Lab study demonstrates the value of such planning, indicating an 87 percent increase in utilization of PEV charging in "planned" vs. "nonplanned" areas.[38] In addition, the California Energy Commission has provided 43 readiness planning and implementation grants to help regional planning initiatives. These resources provide much of the framework for TCC Program initiatives and hence are ideal for leveraging. To facilitate resource-sharing activities, stakeholders should organize a "eligible cities project database" consistent with the 66 project areas identified by SGC as eligible for program funding.[39]

**2) Develop "a menu of clean technology offerings."** To encourage program and project diversity consistent with tailored needs of the TCC Program resident, the TCC Program should promote clean technology offerings as a suite of potential options. These options should be chosen based on individual and/or community needs assessment, made available throughout the TCC Program area and be publicly accessible and available online as a resource to be shared across the community.

**3) Develop a robust education and outreach plan.** Ensure that TCC Program's E&O channels are prepared to educate the community about clean technology choices. CSE's experience with E&O for the CVRP, CSI and SGIP have demonstrated a range of benefits from direct and indirect engagement with clean technology consumers and stakeholders. This E&O will be especially crucial in DACs and in support of low-to-moderate income households. In addition, recognizing California's multicultural landscape will be crucial to communicate in multilingual ways, via consumer awareness campaigns that target communities with limited knowledge of air pollution impacts.

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**4) Seek to "trigger a rare event."** Currently, the SGC envisions a minimum of 50 percent match, which suggests that the program will in fact be composed of a crowd-sourcing initiative that will yield no less than $210 million in commitment.[40] Recognizing that these investments will be within an isolated and geographically specific area, an organized, substantial, aggressive, comprehensive and concurrent release of project activities and offerings may in fact trigger what is known in data-speak as a "rare event."[41] While rare events are generally difficult to explain and predict, the influx of this substantial funding source will create measurable and quantifiable social changes poised to be captured. In this regard, the TCC Program's measurement indicators will serve as a critical tool to evaluate program activities—and may even lead to the capturing of rare event data as discussed.

In this regard, a funding strategy that focuses on offering all program services simultaneously is warranted. If the goal is to entice large-scale, comprehensive and diverse investments that are in fact catalytic, there will be less value in "trickle funding" the TCC Program. As such, it is strongly encouraged to liquidate the lion's share of TCC Program funds in a single funding initiative, and in a uniform manner, with a clear start date for all program activities.

**5) Ensure a robust data collection plan.** To optimize the program's evaluation, monitoring and verification activities, it is essential to develop a robust data collection plan that contains uniform data with a defined purpose and supports streamlined reporting with characteristics that are granular, geographical and categorical. This would complement SB 350 Barriers Report policy, which discusses optimal data collection practices for state programs in support of DACs.[42] Generally, proactively establishing data collection methodologies such as these will set the stage for accelerated, sustainable program replication and expansion.

**6) Ensure data is usable and in clear formats.** A best practice is to encourage anonymized and aggregated data collection that is uniform, has a defined purpose and is granular and categorical, all of which contribute to streamlined data reporting. To ensure transparency, this data should be publicly available (via websites and other public forums) and accessible in common, readily utilized formats. To encourage independent assessment, data should be easily accessible online in formats such as Excel and Access and for geographic information systems in Keyhole Markup Language (KML). In addition, this data should be frequently updated for the public to promote independent research activities.

**7) Conduct deep program analysis.** Stakeholders, researchers and policymakers should be positioned to conduct deep analysis of this unique event, especially in the case that they in fact trigger a rare event. In this regard, research universities, policy think tanks, philanthropists, legislative committees and others should plan to conduct a concentered and deep assessment of TCC Program activities. Of course, these activates should avoid being intrusive to TCC Program residents and their experiences, but nonetheless efforts should be taken to encourage research to learn from this unique opportunity.

**8) Adjust as needed.** Recognizing the differences between policy planning and implementation, it may be possible that the first iterations of the

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TCC Program do not end up producing "ideal" program activities. As such, stakeholders should be prepared to adjust program activities based on qualitative and quantitative feedback and be prepared for programs that are iterative and responsive to community input. A detailed data collection processes, coupled with thorough program analysis, will create a feedback loop that will be ideal to inform such program iterations and modification.

**9) Repeat.** To achieve the ultimate goals of the TCC Program, investments will trigger economies of scale, expanded partnerships and innovation, which will lead to opportunities for replication. Though robust practices that are iterative and able to adjust to best practices and lessons learned, the likelihood of program replication increases dramatically.

## Conclusion

CSE is pleased to have presented: *As We Lift All Boats: A Vision of Clean Technology Integration in the Transformative Climate Communities Program*.

We ask you to consider remarks from Dr. Manuel Pastor speaking about the secret to equitable growth: "... *[our communities] are interlinked, and that the [Los Angeles] region will only do well if everyone in the region is doing well and it's going to do no better than the least well-off among us.*"[43]

In this regard, the TCC Program represents a unique opportunity to concentrate on strengthening the linkage between clean technology and local communities. It presents us opportunities to apply our capabilities and innovative spirit and resolve, not only to address social inequities, but to create first-of-their-kind incubators and data streams that can drive innovative technology activities in the communities that will benefit the most from clean technology integration.

Through policies that prioritize inclusion, interaction, inundation, technology diversity, early exposure and savings, the TCC Program will spearhead this stewardship. By using education and outreach, data and incentives, the program will leverage proven policy tools that will lead to program success. Through implementing strategic practices that organize and develop systematic program design and data collection plans, the program will capture unique insight into this bold undertaking. Moreover, through the concerted integration of a menu of clean technology program offerings, we will in fact build a program capable of "lifting all boats."

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# ENDNOTES

1  Transformative Climate Communities Program; Website access: http://sgc.ca.gov/Grant-Programs/Transformative-Climate-Communities-Program.html.

2  California Climate Investments; Summary of Climate Investments; Website access: http://www.climateinvestmentmap.ca.gov/.

3  Note, in addition to this one-time investment, efforts will continue to expand beyond this funding allocation in subsequent years.

4  Transformative Climate Communities Program, Proposed Final, July 2017, Website access: http://sgc.ca.gov/resource%20files/08242017-TCCFINALGUIDELINES-Revised82317.pdf.

5  AB 2722's authors included Assembly Members Autumn Burke, Joaquin Arambula and Freddie Rodriguez and co-author Senator Connie Leyva.

6  These thresholds of need were identified using the CalEnviroScreen; Website access: https://oehha.ca.gov/calenviroscreen.

7  AB 2722 (Arambula, Burke, Rodriguez); Website access: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB2722.

8  Indicators are quantitative measures including project-related metrics that show changes in conditions over a period of time. Website access: http://sgc.ca.gov/resource%20files/08242017-TCCFINALGUIDELINES-Revised82317.pdf.

9  Experience Electric; #TheBetterRide; Campaign Report; August 2016; Website access: https://energycenter.org/sites/default/files/docs/nav/transportation/experience-electric/MTC_EXEL_Final_Report.pdf.

10  SGIP Case Studies: Website access: http://energycenter.org/self-generation-incentive-program/business/news.

11  Electric Vehicle Charging's Role in Reaching Zero Net Energy Goals; Website access: https://energycenter.org/civicrm/event/info?reset=1&ccse-menu=none&id=2503.

12  Generally, grid resiliency has touchpoints across a wide range of state agencies, including CARB, CPUC, Energy Commission, and has touchpoints on national matters (e.g., EPA's Clean Energy Incentive Program, which is part of the national Clean Power Plan).

13  Notably, this is one of the objectives of the TCC Program; Website Access: http://sgc.ca.gov/resource%20files/08242017-TCCFINALGUIDELINES-Revised82317.pdf.

14  The energy storage market grew 243 percent in 2015—the largest year on record; Green Tech Media: http://www.greentechmedia.com/articles/read/us-energy-storage-market-grew-243-in-2015-largest-year-on-record.

15  CPUC Self-Generation Incentive Program; Website access: http://www.cpuc.ca.gov/sgip/.

16  US-DOE; Alternative Fuels Data Center http://www.afdc.energy.gov/fuels/prices.html.

17  Senate Bill 350, Website access: https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350.

18  2016 ZEV Action Plan; Website access: https://www.gov.ca.gov/docs/2016_ZEV_Action_Plan.pdf.

19  CARB; Advanced Clean Transit; Website access: https://www.arb.ca.gov/msprog/bus/bus.htm.

20  The California State Freight Action Plan, among other policies, sets a Transition to Zero Emission Technology Target, which will deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030; Website access: http://www.casustainablefreight.org/faq.html.

21  CPUC; Assigned Commissioner's Ruling Regarding the Filing of the Transportation Electrification Applications Pursuant to Senate Bill 350; Website access: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M167/K099/167099725.pdf.

22  As reported in Low Carbon Fuel Standard Regulation, Table 6, the average mixture for California electricity is 105.16 gCO2e/MJ; Website access: http://www.arb.ca.gov/regact/2015/lcfs2015/lcfsfinalregorder.pdf.

23  When regions lack shared mobility options, the use of innovative mobility options, such as e-bikes and e-scooters,

should be considered. The TCC Program provides the opportunity to test innovative, community-scale mobility options and vehicle-sharing projects complementary to state policy that support local, community mobility activities with no GHG emissions. E-bikes and e-scooters complement SB 350 TE provisions targeting support to DACs, fit within the definition of TE per SB 350 and are consistent with the California Air Resources Board's (CARB's) Air Quality Improvement Program 2016-2017 plan, which recognizes e-bikes as an eligible mobility option component. Fundamentally, supporting e-bike and e-scooter deployment provides an additional option of localized, active transportation that can be coupled with TE. This approach can test "minimum viable product" technologies that replace fossil fuel miles with electric miles and can deploy pilot projects that record and quantify e-bike travel behavior and information (i.e., travel patterns and usage, charging patterns). Moreover, these vehicles could be charged from grid-connected or stand-alone clean DG resources, as demonstrated by California-based e-bikes projects, and could be responsive to demand response scenarios. In densely populated areas, including San Francisco, companies are successfully deploying and scaling e-scooter programs.

[24] This project would align with the California Sustainable Freight Action Plan (CSFAP) pilots.

[25] California High-Speed Rail Authority: Station Communities; "Vision and planning: both playing key roles as the California High-Speed Rail Authority works to develop stations. Our vision is that high-speed rail stations will serve as more than just a train stop, they will transform cities, create community hubs and be iconic of the state. That is why we're calling them 'Station Communities.'" Website access: https://www.hsr.ca.gov/Programs/Station_Communities/index.html.

[26] California High-Speed Rail Policy Directive: Poli Plan-03, August 19, 2013, page 7, Website access: http://www.hsr.ca.gov/docs/programs/green_practices/sustainability/Sustainability_signed_policy.pdf.

[27] CSE's Equinox Project is a nonpartisan policy initiative that turns research into action to help the San Diego region achieve a more prosperous economy, healthy environment and outstanding quality of life for all its residents as it grows. Through in-depth research, policy analysis, communications and convenings, Equinox Project inspires, informs and engages the public and decision-makers in crafting better solutions to the region's growth challenges and strives to maintain and enhance exceptional quality of life for residents and the region's many visitors. Website access: https://energycenter.org/equinox.

[28] Equinox Project's San Diego Regional Quality of Life Dashboard consists of 15 categorical indicators; Website access: https://energycenter.org/sites/default/files/2016-equinox-regional-dashboard-report.pdf.

[29] Vibrant Communities and Landscapes a Vision for California in 2050 (Draft for Comment & Discussion), Website access: https://www.arb.ca.gov/cc/scopingplan/meetings/091316/vibrant%20communities.pdf.

[30] In addition, incentives should be coordinated with existing and complementary incentive programs, such as the enhanced fleet modernization program (for light-duty ZEVs).

[31] https://energycenter.org/permitting/guidebook.

[32] https://energycenter.org/sites/default/files/docs/nav/programs/pev-planning/san-joaquin/san_joaquin_valley_pev_readiness_plan-web.pdf.

[33] http://www.pevcollaborative.org/sites/all/themes/pev/files/PEV_Permitting_120827.pdf.

[34] https://energycenter.org/sites/default/files/docs/nav/programs/pev-planning/san-diego/fact-sheets/ResComm%20EVSE%20Permit%20Guidelines%20v3_Final_attach.pdf.

[35] Eleven California cities participated in the creation of innovative proposals through the U.S. Department of Transportation's Smart City Challenge. Smart City Challenge Proposals were submitted by San Francisco, Chula Vista, Fremont, Fresno, Long Beach, Moreno Valley, Oakland, Oceanside, Riverside, Sacramento and San Jose.

[36] The Office of Planning and Research indicates that over 200 California cities have climate action plans, 88 have GHG reductions plans and 63 have sustainability plans—many of which can provide foundational guidance for TCC projects. The Governor's Office of Planning and Research has prepared a list of plans and initiatives adopted by California jurisdictions to address GHG emissions. These plans typically involve setting GHG emission reduction goals and adopting implementation measures to achieve those goals. Website access: http://www.opr.ca.gov/docs/California_Jurisdictions_Addressing_Climate_Change_PDF.pdf.

[37] US-DOT Smart City Challenge; Addressing the challenges of today and tomorrow; Website access: https://www.transportation.gov/smartcity.

[38] How Does Utilization of Non-Residential EVSE Compare Between Those Installed in Oregon in Planned versus Unplanned Locations; April 2015; Website access: https://avt.inl.gov/sites/default/files/pdf/EVProj/UtilizationOfNonResEVSEInstallationVsPlan.pdf.

[39] These 66 cities are detailed in the Appendix B: Cities Eligible for TCC Implementation Grants, of the SGC's Draft Guidelines, Fourth Revision; Website access: http://sgc.ca.gov/resource%20files/08242017-TCCFINALGUIDELINES-Revised82317.pdf.

[40] We should also keep in mind that the current 2017-18 budget may also yield additional funding to the program, although exact funding is TBD.

[41] Logistic Regression in Rare Events Data; Gary King, Harvard University, and Langche Zeng, George Washington University.

[42] Commission Final Report for the SB 350 Low-Income Barriers Study, Part A: Overcoming Barriers to Energy Efficiency and Renewables for Low-Income Customers and Small Business Contracting Opportunities in Disadvantaged Communities; Adopted by the Energy Commission at the December 14, 2016, Business Meeting. Page 62. Website access: http://docketpublic.energy.ca.gov/PublicDocuments/16-OIR-02/TN214830_20161215T184655_SB_350_LowIncome_Barriers_Study_Part_A__Commission_Final_Report.pdf.

[43] America's Tomorrow: Equity Is the Superior Growth Model, Website access: http://www.policylink.org/focus-areas/equitable-economy/americas-tomorrow-newsletters/interview-with-scholar-activist-manuel-pastor.

For more information on CSE policy initiatives,
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## Center for Sustainable Energy

The Center for Sustainable Energy® (CSE) operates where energy and climate policies and the marketplace converge — providing integrated consumer education and incentive programs as well as facilitating research and program guidance for regional and state sustainable energy planning and policymaking.

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