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## Inclusive Finance EE +E Programs May be the Only Means to Meet SB1477 Requirements

*Additional submitted attachment is included below.*

## Inclusive Finance EE +E Programs May be the Only Means to Meet SB1477 Equity Requirements

Comments by Mitsubishi Electric US, Bruce Severance, Policy Analyst, Regulatory Compliance Engineer
August 8, 2019, CPUC Docket Number: R.19-01-011, CEC Docket Number: 19-IEPR-06

### Mitsubishi's Resolve to Address the Climate Crisis through Advanced Technologies

On June 13, 2019, just six weeks ago, Mitsubishi Electric Corporation (Tokyo) unveiled its Environmental Sustainability Vision 2050 to clarify the company's position on long-term environmental issues. Central to this vision is the company's declaration to "protect the air, land and water with our hearts and our technologies". Key environmental action guidelines and initiatives include: climate change measures and mitigation, application of diverse technologies in wide ranging business areas to address environmental issues, and promotion of "new values and lifestyles" that are more in "harmony with nature". These initiatives reflect "Mitsubishi Electric's resolve to operate as a responsible, eco-minded corporate citizen". They also reflect a corporate philosophy that recognizes the negative impacts of selfish personal or business goals that are focused on near-term profits or outcomes. Such business models have resulted in contamination, resource depletion, species extinction and the climate crisis. Climate denial perpetuates this short-sighted business model. Mitsubishi Electric has committed to focus on global solutions, and think of ways to create safe, abundant and comfortable lifestyles for future societies. Facilitation of electrification programs, new business models, and continuous improvement of technologies to address these global problems are consistent with Mitsubishi Electric's mission.

### The Urgency of the Climate Crisis Requires Flexible and Rapid Response from Regulators

The following excerpts from the National Climate Assessment underscores the urgency and broad economic impacts of climate change on Americans, the American way of life, and the California economy:

*Observations collected around the world provide significant, clear, and compelling evidence that global average temperature is much higher, and is rising more rapidly, than anything modern civilization has experienced, with widespread and growing impacts. The warming trend observed over the past century can only be explained by the effects that human activities, especially emissions of greenhouse gases, have had on the climate.* (Climate Science Special Report, Vol. 1, National Climate Assessment 4, pg. 39)

*Rising temperatures, extreme heat, drought, wildfire on rangelands, and heavy downpours are expected to increasingly disrupt agricultural productivity in the United States. Expected increases in challenges to livestock health, declines in crop yields and quality, and changes in extreme events in the United States and abroad threaten rural livelihoods, sustainable food security, and price stability.* (NCA4, pg.29)

*The potential for losses in some sectors could reach hundreds of billions of dollars per year by the end of this century.* (NCA4, p.50)

Fossil fuel combustion accounts for approximately 85% of total U.S. greenhouse gas emissions, with agriculture, land-cover change, industrial processes, and methane from fossil fuel extraction and processing as well as from waste … accounting for most of the remainder. (NCA4 p.64)

Analyses estimated that the area burned by wildfire across the western United States from 1984 to 2015 was twice what would have burned had climate change not occurred. …. Tree death in mid-elevation conifer forests doubled from 1955 to 2007 due, in part, to climate change. (NCA4, p.163)

More alarming to Californians is the NCA4's California State Summary (uploaded to the docket) which predicts saltwater intrusion into the Sacramento Delta, a critical hub for the State's freshwater canal system and the projected loss of snowpack as a natural reservoir. (NCA4, California State Summary page 4). A 2018 University of California report's projected 90% loss in the State's arable land and agricultural output by 2100due to saltwater intrusion on aquifers and severe drought.*[1] There is evermore urgency to mitigate these effects as swiftly as possible before long-lasting and irreversible impacts on the State's economy take effect.

**Predictable Climate Impacts Will Cost California Households $4000 per Year**

A comment from Mitsubishi Electric US submitted to the CPUC docket last January entitled "Climate Change Cost Impacts on California Households" summarized categories of climate impacts that are conservatively estimated to cost California households an average of $4000 per year for the 40-year period starting in 2020. (See paper uploaded again to the docket with corrections on August 8, 2019.) There is currently no method used by the CPUC to evaluate these "climate externalities", costs born indirectly by everyday citizens and which will require billions of dollars of government expenditure if we wait for crisis management scenarios to play out for another 20 years. The NCA4 and IPCC5 reports make it abundantly clear that early mitigation costs far less than later mitigation. California should lead the way in this early mitigation strategy. The cost of building electrification is competitive in most California climate zones, particularly if the Inclusive Finance Model is used to identify the most cost effective projects first, which would assure ratepayers of a reduction in total utility costs.

**Why Not RNG and Hydrogen in the Building Sector?**

Many pro-gas interests have argued that RNG (renewable natural gas) and hydrogen are viable alternatives to the use of natural gas to heat buildings. Although these technologies have a place in the decarbonization of the State's economy and research and prototyping should be subsidized, there is need for these high-heat fuels in industrial and transportation sectors and the viability of sufficient volumes of production are too tentative to gamble on this alternative for heating buildings. Several reports published in the last year indicate that if all biomass sources within the state were tapped for RNG production this would meet only 20% of current NG demand, and even factoring future efficiency gains, cannot meet more than 35% of building heating needs. Proponents argue that additional biomass materials can be imported from surrounding states, but this is a short-sighted argument that ignores the need for similar RNG processing in those states. Clearly, the problem is global and not unique to California.

While power to gas hydrogen generation is a promising technology, the economics and cost-effectiveness of hydrogen are uncertain at best. A 1987 Princeton University study projected then that the hydrogen economy would be cost effective in 20 years. Thirty years later the cost of hydrogen is still many times too great to compete with natural gas and it may not be able to compete unless a carbon tax is raised specifically to subsidize a more rapid deployment of this technology and to achieve

*1 California Agriculture Faces Serious Threats from Climate Change, The Desert Sun, Ian James, Feb. 28, 2018

accelerated economies of scale. In any event, hydrogen is a thinner molecule and will more readily leak in our aging natural gas infrastructure. Recent accidents, such as San Bruno, remind us of the increased hazard of introducing hydrogen into the existing gas infrastructure. Rather than introduce hydrogen into an aging infrastructure known to have leakage and safety problems, power to gas conversion plants should be built near current natural gas peaker plants and introduced into as a NG replacement to address grid harmonization challenges with a carbon free solution. Appropriate applications are critical to growing public safety issues.

**Inclusive Finance Model to Reach Rental and Low-Income Markets**

Inclusive Finance EE Pilots in the South and East have proven extremely capable of reaching the low-income and rental markets with exceptionally high acceptance rates of 40% to 90%. More importantly, they bridge the "split-incentive" catch-22 wherein renters have no cause to invest in property they do not own, and landlords have no incentive to invest in efficiency when they do not pay the utility bills. Under the Inclusive Finance (IF) Model, the resident is not asked to qualify for a loan or pay for improvements behind the meter and buy into the energy savings and ROI projections. The value proposition to them is simply: "will you accept a guaranteed reduction in your total utility bills of 10% to 20%?" The resident, renter or homeowner, is not expected to fund the repairs in any way, which are 100% funded from future energy savings. This guarantee of utility bill reduction funded from future energy savings makes the value proposition to the resident irresistible and removes nearly all imaginable market barriers for about 50% of the housing stock in California. The rest of the housing stock is either at risk of not producing sufficient energy savings due to the cost of upgrading existing building conditions, or due to relative fuel costs.

The home or structure that is subject to improvement is risk-assessed for cost effectiveness, continued habitability, and just how fruitful the ROI scenarios will be. The utility, or utility supported residential energy services company (ESCO), knows that the high-ROI energy savings are relatively certain through a clear, multi-faceted risk assessment of the property conditions. They are significantly better prepared than the homeowner or renter to assume this risk, and this assumption of risk entirely removes significant market barriers to scaling up the EE market.

The proof is in the data. The Energy Upgrade California program has cost millions of dollars per year with relatively high marketing and administrative overheads in large part because of risk aversion on the part of home owners who question the certainty of energy savings. The program requires numerous verifications to assure that energy upgrades will actually produce the estimated savings based on modeling which is itself imperfect. Inclusive Finance by contrast relies on actual energy savings and minimizes risk by targeting the highest ROI projects first, but enjoys 40% to 90% acceptance even in low-income and rental markets. The contrast in marketability of these differing EE program models is a clear indication that Inclusive Finance is the only means to adequately address the environmental justice requirements of SB350 and SB1477. The bulk of the EE improvements made through the IF Model are financed through future savings and so also leverage and reserve rebate dollars for other "wrap around" services or programs, such as panel and circuit upgrades where required, or EE programs targeting low-income homes that are not readily retrofitted under the IF Model due to other preexisting conditions.

**Adaptation of the Inclusive Finance Model to California's Electrification Goals**

Bruce Mast, former Director at Build-It-Green, has been working on a zip code-granular analysis of the applicability of the Inclusive Finance Model to an energy efficiency plus electrification (EE+E) program design in conjunction with the Building Decarbonization Coalition and program designers from other regions of the country with IF expertise. A dream team of policy and energy analysts with significant prior PUC and CEC experience has been assembled to evaluate program design recommendations that will facilitate third-party administrator adoption of this model. The analysis includes risk assessment criteria of properties, given preexisting conditions, water damage variables that impact habitability, building geometries such as vaulted ceilings, access to ducts for repair, access to crawl spaces and attics, etc. A combination of factors are required for Inclusive Finance to meet the ROI and "cash-positive" requirements of the model, and this risk assessment identifies where the model is most applicable. Where regional markets are readily identified to meet key criteria, address by address targeting for program recipients is possible using XeroHome's super-computing city wide assessment methods that yield highest prospect targets for retrofitting by address. The combination of these tools with IF Program design promises to scale energy retrofits from 11,000 per year to 500,000 per year by 2025, roughly a fiftyfold increase –without reliance on rebate and tax dollars and thereby avoiding roughly $20 billion in annual costs if the same were attempted through direct subsidy in the low-income market. This represents a huge savings to California taxpayers and ratepayers in addition to the projected energy savings. Those who are investigating IF program design believe it is the only fiscally conservative, low-risk path to addressing the State's electrification objectives.

**Addressing the Broken Supply Chain**

For years customers and contractors commonly believed that heat pumps would not heat homes as effectively, but "cold-climate" heat pumps work efficiently down to -20°F. On-line webinars by "energy and HVAC experts" still bring up a hypothetical and outdated need for strip heat back-up when such inefficient supplementary heat is <u>not</u> needed in climates that do not see sub-zero temperatures. The reality is that contractors are just not familiar enough with heat pumps due to preconceptions formed 20 years ago, while the technology has fully evolved and is effective in every California climate without the use of strip heat (resistance electric heating). There is little awareness or demand for heat pumps and contractors would rather talk a client out of them than install one. Consequently, contractors, box stores and distributors do not keep them "on-hand" and when 96% of all HVAC systems are replaced under "emergency circumstances" on short notice, heat pumps are rarely selected due to the need to install additional dedicated circuits. All of these barriers to acceptance call for better contractor training and the need for mid-stream incentives to get distributors stocking product. The TECH Program under SB1477 recommends better quality installation training as well as midstream incentives and we support these proposals.

**Heat Pump Incentives and Low-GWP Refrigerants**

Heat pumps for both space and water heating are central to the states decarbonization plans. Although most heat pumps operate on refrigerants that have some global warming potential (GWP), the HVAC industry is moving swiftly to develop lower GWP refrigerants and is working with CARB to determine near term goals. The text of SB1477 encourages manufacturers to move toward ultra-low GWP refrigerants and proposes to incentivize them, which Mitsubishi Electric supports, however, we ask that

regulators remain conscious of the fact that product development cycle times are generally long, 8-10 years, especially in regard to new refrigerants which require every element of a system to be redesigned, extensive durability testing compared to more conventional products, and completely new distribution (parts and contractor familiarity) and training infrastructure development.

Incentive design should encourage the long-range investment in ultra-low GWP refrigerants and systems, without inhibiting near term support of the systems that are currently on the market. The global GWP refrigerant contribution to climate change is estimated to be less than 3% of the climate crisis problem.

Most of this is from unwanted and unintended leakage from refrigerant piping installed by contractors who are required to have minimal EPA 608 training on system charging and refrigerant capture and disposal. Most of the near term leakage and intentional release can be mitigated through better EPA 608 training and much higher fines on contractors found to intentionally release gases. Mitsubishi Electric enthusiastically supports continuing education requirements on quality installation and refrigerant handling due to environmental, performance, efficiency and customer satisfaction impacts. Incentive programs can be offered only to contractors who complete such advanced training and CEU requirements, including the lead installers in the field.

**The Need for a Program Paradigm Change and Fund Allocation Ratios**

The current proposal for fund allocation is $30M to TECH and $20M to BUILD. CEC staff invited feedback on this allocation. First, it is clear that these budgets are extremely small relative to the objective of electrification of the building stock in 20 years. Given that there are 10 million homes in California needing energy upgrades and electrification, we need to ramp up to 500,000 homes a year within three years to accomplish the State's goal in the allotted time. The $23 million in project costs (excluding admin overheads) covered by the TECH Program is enough to allocate either $2500 rebate to 9,200 homes or fully fund about 1,000 homes to the tune of $23,000 each. Thus the budgets are completely unrealistic to the task of actually achieving market transformation.

Rebates are helpful to stimulate new markets, but they aren't enough funds to achieve the scale that is needed to meet the climate crisis. These are conventional ways of approaching the problem. New thinking and finance models are needed. Using future energy savings to pay for needed improvements, as the Inclusive Finance Model does is a paradigm shift that allows program dollars to be allocated differently.

At the current rate of energy efficiency work being performed on an annual basis (approx. 11,000 per year in the EUC program), it would take approximately 900 years to just perform energy upgrades on the 10 million homes that need electrification. We need a program that is so popular that it scales fiftyfold, using a fraction of the funding one would imagine is required. On average, homes put through the Energy Upgrade California Program achieved 30% to 40% energy savings. Now we are discussing adding electrification to the mix with additional factors such as circuit upgrades that do not directly deliver energy savings. Following the same old formula of offering $2500 to $4000 in rebate dollars that pay for a quarter or a sixth of the total project costs while expecting residents to finance the $15,000 balance of the project will not achieve the market penetration needed. The EUC Program has proven that. The

Inclusive Finance Model may be the only way to leverage these dollars while targeting low-income families first.

Furthermore, because the value proposition to the resident is high, the guarantee of high energy savings, this program is more likely to sell itself with targeted utility mailers rather than "fuzzy-bear" TV advertising. The administrative costs would be lower, and allow allocation of more funds to actual project costs.

**Remove the Gas Infrastructure Loophole**

It is clear from prior analyses that it is far less expensive to build all-electric homes than to retrofit them, and some analysis put the cost savings for all electric neighborhoods at roughly $6,000 lower than mixed fuel due to the savings on the gas infrastructure. However, free competition is not being allowed to operate on a level playing field. Gas distribution utilities are allowed to offer installation of the gas infrastructure to developers at no cost to them and amortize those costs over years of customer billing. It is not clear how common this practice is, and it is odd that this loophole is allowed while electric utilities have been restricted from fuel switching at a later time without meeting a cost-effectiveness criteria. It is a bit like giving away a color printer for under fair market value to make the money back on the ink cartridges. If this gas infrastructure donation loophole was removed, developers would naturally gravitate toward electrification, and there would be little need to subsidize this transition with direct rebates. The loophole acts as a strong disincentive to electrification. The data and consumer feedback indicates that there would still need to be public education on inductive cooktops and electric fireplaces to support the developers' transition to all-electric. Build program dollars could be reallocated to the TECH Program's retrofit market, where the relative cost of replacing gas water heaters and furnaces is higher due to panel upgrades.

Sonoma Clean Power has a lending library demonstrating that 9 out of 10 consumers prefer inductive cooktops once they have had experience with them. Any developer concerned about consumer acceptance of these technologies in the introductory market, should have such a lending library, or even give away sixty dollar inductive hot plates to prospective home buyers. Similar issues arise around gas fireplaces.

If the gas infrastructure loophole was closed, more Build Program dollars could be allocated to the TECH Program where the funding is more needed, and the BUILD Program could focus on consumer education and acceptance barriers. If the IF Model is applied to the TECH Program, the reach of the program would not just double, it could expand fiftyfold, while specifically targeting the low-income families that need it most.

**A Last Word on Subsidies and Externalities**

While the fossil fuel industry and its hired public advocates like to propose arguments about equity and fuel choice as if there were no externalities and other societal costs associated with fossil fuels, the reality is that the fossil fuel industry has benefited from subsidies to the tune of $300 billion to $600 billion per year in recent history, at much higher levels than any other industry in history, while causing environmental degradation, health impacts and climate change which directly affect ratepayers:

"*The degree and impact of fossil fuel subsidies is extensively studied. Because fossil fuels are a leading contributor to climate change through greenhouse gases, fossil fuel subsidies increase emissions and exacerbate climate change. The OECD created an inventory in 2015 of subsidies for the extraction, refining, or combustion of fossil fuels among the OECD and large emerging economies. This inventory identified an overall value of $160 to $200 billion per year between 2010 and 2014. Meanwhile, the International Energy Agency has estimated global fossil fuel subsidies as ranging from $300 to $600 billion per year between 2008 and 2015."* (From: https://en.wikipedia.org/wiki/Energy_subsidies)

According to the International Energy Agency, the elimination of fossil industry subsidies and tax breaks is one of the most cost effective ways to address climate change. In May of 2016, the G7 nations set for the first time a deadline for ending most fossil fuel subsidies by 2025. In reality, given the scope and acceleration of climate change already witnessed, this timeline is too generous, and it is inappropriate for fossil fuel interests to object to subsidies for clean technology solutions or to deny direct climate impacts, when they themselves owe a debt, not only for subsidies they have received, but for the environmental degradation and negative impact to the American way of life that they have caused. At some point the causal link will become undeniable, and we must all hope that it is not too late at that point to reverse the damage. To now claim that electrification is going to unfairly impact low-income families, while ignoring indirect climate costs and past subsidy costs to ratepayers, is an inequitable form of selective attention. It is more appropriate for them to now consider ways to diversify into building the clean technology infrastructures that are now needed to continue the American Dream into the future. They should join the fight against climate change rather than deny the externality impacts and costs to consumers.