



Johns Manville

A Berkshire Hathaway Company



Comments of Johns Manville and Nest in Response to the California Air Resources Board 2017 Climate Change Scoping Plan Update

These comments are submitted by Johns Manville (JM) and Nest Labs, Inc. (Nest) in response to the January 2017 Climate Change Scoping Plan Update (Update). We commend the Air Resources Board (ARB) for its work to establish a framework for action to reduce greenhouse gas emissions in California 40% below 1990 levels by 2030.

The proposed 2017 Scoping Plan Update notes that energy efficiency will be called upon to help achieve significant GHG emissions reductions *in all scenarios evaluated*. The Update identifies as one of its major elements the implementation of SB 350, which would require a doubling of energy efficiency by 2030. And in the ***Proposed Scoping Plan Scenario*** ARB at page 43 shows that energy efficiency will need to achieve 54 MMTCO₂-e, nearly as much as mobile sources and the 50% RPS.

In order to achieve this magnitude of efficiency-related GHG emissions reductions, the State will need to vastly increase – to millions per year – the number of existing homes and buildings that are retrofitted with at least a basic energy efficiency upgrade. In ARB’s May 2015 Scoping Plan Update ARB states in Appendix C ([Electricity and Natural Gas Working Paper](#) at Page 23):

In addition to savings from efficiency standards for new construction, there is significant opportunity for savings in existing buildings. Of California’s 13 million existing buildings, more than half of residences and more than 40 percent of commercial buildings were built before 1978, when the state first implemented the [Title 24] Building Energy Efficiency Standards. This leaves open opportunities to significantly decrease energy use in the existing housing market using energy efficiency measures.

To meet the State’s climate goals, ARB plainly recognizes the magnitude of the task at hand (Page 24):

Deploying affordable and effective energy efficiency improvements in all of California’s diverse buildings will be a major challenge. **Millions of energy upgrades need to be initiated in existing buildings to meet the state’s efficiency and GHG reduction goals,** which will involve sizeable investments and program coordination for all building types in all regions of the state (emphasis added).

In order to make this happen, the State will need to both optimize existing energy efficiency programs to maximize GHG emissions reductions as well as devote additional resources to new, but proven, energy efficiency retrofit approaches.

One such approach is embodied in the South Coast Air Quality Management District's **Control Measure No. ECC-02** ("CO-BENEFITS FROM EXISTING RESIDENTIAL AND COMMERCIAL BUILDING ENERGY EFFICIENCY MEASURES [NOX, VOC].") That Control Measure is based on a project that completed a basic energy efficiency retrofit to 2,100 homes in the disadvantaged communities area of eastern Riverside County's Coachella Valley. The project used a scalable approach as well as new product insulation and air sealing installation approaches that drastically reduced the average per unit cost to \$1,950. Various project results were quantified including: total and unit energy savings; GHG emissions reductions; reductions in other pollutants; unit and total bill savings.

The Coachella Valley Project is a prime example of a cost-effective residential weatherization/energy efficiency retrofit project that delivers significant greenhouse gas reduction benefits, as well as a range of other key objectives articulated in the Scoping Plan Update, including air quality improvements, consumer energy cost savings, improvements in the health and safety of home occupants in disadvantaged communities, and increased climate resiliency.

The project was funded by the South Coast Air Quality Management District (AQMD) under the mitigation funds made available under AB 1318 (Perez) for the Sentinel Power Plant. The purpose of those funds was to implement projects that would help offset the air emissions of that new plant, there being no emission reduction credits available.

JM installation partner **Add Insulation** was initially awarded \$3.25 million in late 2013 to perform basic efficiency retrofits on homes in either the AQMD-designated environmental justice area or in the disadvantaged communities in the Coachella Valley. The AQMD has twice expanded the funding to a total of \$4.0 million so that by the end of 2016 2,100 homes have been retrofitted.

To our knowledge, this project is the first project of its kind in that it was funded and overseen by an air quality regulator for the purpose of emissions reductions and disadvantaged community benefits that can be achieved via energy efficiency, and not just for the sake of saving energy. As noted above, the Coachella Valley project has been successful enough that it is now formally part of the AQMD's Air Quality Management Plan: Control Measure No. ECC-02 ("CO-BENEFITS FROM EXISTING RESIDENTIAL AND COMMERCIAL BUILDING ENERGY EFFICIENCY MEASURES [NOX, VOC]").

Rather than perform a deep efficiency retrofit with advanced diagnostics, it was decided to perform a basic retrofit on each home so that more homes could be completed at lower cost and in a relatively short period of time. Given the vintage, architecture and condition of the modest homes in the Coachella Valley's disadvantaged communities, the work included air

sealing the attic floor and adding loose fill fiber glass insulation to achieve R-38. None of the homes in the area had air sealing between the conditioned living space and the unconditioned attic. And the homes typically had degraded or poorly installed insulation to an effective level of only R-11.

Based on modeling with *EnergyPro* v5.1 software each home should achieve energy savings of approximately 10%, which is approximately 1,560 kWh and 35 therms per home per year. Using US EPA-approved attribution methods these energy savings should also achieve annual aggregate emissions reductions both in the utility sector and on-site **of 1,630 tons of GHG** and 90 pounds of fine particulates.

In order to keep the cost per home under \$2,000, some new installation techniques and products were used. And using local crews to reach out to the community enabled us to limit the amount of funds spent on education, marketing and outreach to under 1.5% of the total project cost.

The Coachella Project is a clear model of how California can cost-effectively bring energy efficiency upgrades to the older, poor performing homes in disadvantaged communities across the state.

Furthermore, energy efficiency done correctly can also enable residential demand response because the more efficient a home's envelope is, the more successful a cooling demand response event will be. This is achieved with the use of advanced home energy management systems such as the *Nest Learning Thermostat*, which can be one of Silicon Valley's greatest innovations that can be widely and cost-effectively put to work for disadvantaged communities. This affords a unique opportunity to enable residents in disadvantaged communities to be paid extra money for saving energy via a demand response program.

Additionally, once a home is participating in a successful demand response program, it can also be part of the critically important energy storage effort. JM and Nest are developing a concept for behind the meter, non-battery energy storage specifically for modest homes in disadvantaged communities. With some creative thought and new approaches, California can help make disadvantaged communities in the state a showcase for advanced energy and climate friendly technologies.

California has established aggressive goals for reducing greenhouse gas emissions. As articulated in the Scoping Plan Update, the state must also ensure that these efforts support ongoing improvements in air quality, provide other environmental, social and health benefits – especially in disadvantaged communities, and increase climate resilience. A key component to ensuring this happens is finding ways to rapidly deploy cost-effective energy efficiency retrofits in the residential sector in significant volumes. Building on the success of approaches like the Coachella Valley project must be a major part of these efforts.

We appreciate the opportunity to submit these comments and would be happy to provide additional information.

About Johns Manville

Johns Manville, a Berkshire Hathaway company (NYSE: BRK.A, BRK.B), is a leading manufacturer and marketer of premium-quality products for building insulation, mechanical insulation, commercial roofing, and roof insulation, as well as fibers and nonwovens for commercial, industrial and residential applications. JM serves markets that include aerospace, automotive and transportation, air handling, appliance, HVAC, pipe and equipment, filtration, waterproofing, building, flooring, interiors and wind energy. In business since 1858, the Denver-based company has annual sales of approximately \$2.7 billion and holds leadership positions in many of the key markets that it serves. JM employs approximately 7,000 people and operates 44 manufacturing facilities in North America and Europe. JM's two manufacturing plants in California have over 300 employees. Additional information can be found at www.jm.com.

About Nest

Founded in 2010, Nest is dedicated to reinventing home products like the thermostat and smoke alarm, harnessing advanced technology to create a thoughtful home that takes care of the people inside it and helps address societal challenges like energy consumption, life safety, and home security. Nest products are sold in the United States, Canada, United Kingdom, Ireland, France, Belgium, and the Netherlands, and are installed in more than 120 countries. Nest is an Alphabet Inc. company (NASDAQ: GOOG) based in Palo Alto, California and employs over 700 people in California.

Nest manufactures the Nest Learning Thermostat, a smart thermostat equipped with sensors (for example, temperature, humidity, and motion sensors), Wi-Fi capability, and processors running software to help customers consume less energy. The Nest Learning Thermostat combines inputs such as household temperature preferences (based on manual adjustments), occupancy patterns, and advanced algorithms to learn a household's temperature preferences, adjust the heating or cooling when the house is empty, and automatically lower air-conditioning runtime when humidity conditions permit, helping people lower their energy use without sacrificing comfort. Additional information can be found at www.nest.com.