January 29, 2020

Re: Reducing Greenhouse Gas (GHG) Emissions in Piedmont, CA

Dear Piedmont Planning Department and City Council members,

First off, I'd like to thank the city council for their work on the creation of the East Bay Community Energy and for choosing the default plan to be 100% renewable energy for Piedmont at a nominal (approximately 4%) increase in electricity rates. Piedmont showed leadership in this regard compared to other cities in the East Bay.

I also attended the recent presentation and movie showing at the Piedmont Community Center. I was glad to see that Piedmont is agreeing that our current climate disruption is human-made, and fossil fuel consumption leading to GHG emissions are at the core of the problem.

I was an early adopter of several technologies to reduce GHG emissions in my Piedmont home including a) solar panels; b) ceiling and wall insulation; c) multi-story thermostat controls; d) Energy Star furnace with 2-stage air-only cooling during the summer; e) motion detectors to control exterior lighting; f) tankless gas water heater, and g) a level 2 EV charger for an EV and PHEV.

I read some of the Climate Action Program documents and noticed some approaches could be more effective or less disruptive. For example, I would be cautious in terms of increasing our reliance on the electrical grid given our recent power outages and the likelihood of future interruptions.

First, I'd like to start with a philosophical framework for the adoption of new technologies as follows:

1. Forcing the adoption of specific new technology should only happen if all of the following are true:
    a. The predominant existing technology is an egregious carbon / GHG polluter.
    b. Over its useful life, the new technology is more cost-effective than the predominant existing technology. Typically the new technology produces cost savings over an estimated duration that pays back a higher upfront cost. This cost-benefit model should be validated independently in real-world settings or should be agreed to by a majority of scientists and government agencies. Luckily this is the case for many (but not all) new technologies.
    c. The new technology is a drop-in replacement for the existing technology without major specialized infrastructure work (e.g., costing $500 or more) and requiring a difficult search to find an installer who will show up to work in Piedmont (legally).
2. In the absence of a technology to force adoption of (per 1. above), the alternative of banning a predominant existing technology may be advisable if all of the following are true:
    a. The predominant existing technology is an egregious carbon / GHG polluter.
    b. Compared to the predominant existing technology, there are numerous newer technologies, all of which dramatically reduce GHG and are more cost-effective.

    c. There are no options with worse GHG emissions than the predominant existing technology.
3. If forcing the adoption of new technology is not an option and banning the existing technology is also not an option, an alternative would be to facilitate and streamline permitting of lower GHG technologies at the discretion of the homeowner.

There is no unique way to apply this adoption framework, but I would lean towards being more aggressive than we have been in the past since what we're not making progress fast enough to save our ecosystem and humanity.

I'll go through areas of improvement for Piedmont homes with sample recommendations. Please adjust my suggestions as you think would be more palatable to homeowners (the majority of your voters) while keeping in mind the urgency of action required:

[Home Insulation]: Someone going through a $250,000 home renovation could be mandated to add home insulation. If the cost of insulation is between $5,000 and $10,000, this mandate would add at most 4% of the cost of their renovation. This is a small price to pay to have a significant impact on reducing heating and cooling related GHG emissions. Furthermore, the payback period for home insulation can be between 10-15 years, depending upon rebates and the price of natural gas.

[Water heating]: Constantly using natural gas to keep water heated in a tank produces an obvious waste of energy. Tankless gas heating options have a speedy (3-7 year) payback period compared to other options. There are many options with lower GHG than a gas-heated water tank, including solar thermal, ambient gas heaters, and at-point-of-use electric water heaters. Forcing a particular technology would not be prudent. The Bay Area already regulates new gas water heaters to be significantly reduced "ultra-low NOx" emissions. I believe the main thing to do in Piedmont is to get rid of the old water heaters. If someone is going to get a permit to work on a gas or water line, we should mandate that they upgrade their gas water heater if it is more than ten years old. The cost of a new "ultra-low NOx" gas water heater is around $950 at Home Depot, and installation would cost roughly the same if performed by a licensed plumber. I don't believe this is too much to ask for Piedmont, and the increased efficiency will have a good enough payback period for the homeowner.

[Lighting]: There are several options better than incandescent bulbs, e.g., fluorescent bulbs and LED bulbs. There is also a significant amount of overnight exterior light pollution in Piedmont, likely to create a more safe environment. If someone is getting a permit for exterior lights, we should mandate LED or compact fluorescent bulbs and require motion detection controls. The latter is a more aggressive stance than likely what other cities are doing. A ban on incandescent bulbs inside the house may seem unenforceable but would provide the right encouragement to switch to LED or fluorescent bulbs.

[Permanent heated pools]: We should ban new permits for permanent-fixture heated pools and outdoor hot tubs. We have a water shortage in California, and the GHG emissions of a permanent

heated pool are going to be very large. I may be offending the top 1% of Piedmont here; however, existing structures and indoor jacuzzi tubs would not be affected.

[Windows]: Piedmont homes have a lot of windows, and many are very old. I believe the focus here should be to A) ban new metal windows (which have the poorest U-factor) and B) streamline the process to retrofit single pane windows by eliminating the design review process for high-efficiency windows. The planning commission can decide on an annual basis what maximum U-factors would qualify for the elimination of the design review process.

[Heating/Cooling]: If a Piedmont homeowner is going to redo their furnace, I would require an Energy Star furnace. Since many Piedmont homes are multi-story, often, many stories are unoccupied and don't need to be heated. Mandating multiple thermostats, one on each floor, with a damper control unit, would not be a costly burden. I also got a 2-stage fan-only air cooling option (with an east-facing air intake vent) for hot summer afternoons. When I did my furnace project, the additional cost for these options was approximately $1,500 out of a $10,000 total job.

[Kitchen/Bath renovations]: To facilitate easy installation of under-sink electric water heaters, mandate a regular plug be installed under the sink cabinet. We should require or mandate Energy Star refrigerators, freezers, dishwashers and laundry machines.

[EV and PHEV cars]: Having a level 2 charger at home helps reduce range anxiety for EV cars and helps lower the carbon footprint for PHEV cars and will also help with the adoption of EV and PHEV modes of transportation. Requiring garages come pre-installed with a 240-volt plug-in would simplify the installation of a level 2 charger whenever the homeowner decides to go EV. The 240-volt plug and materials are quite cheap, and an electrician could charge under $400 for the installation. I would mandate this upgrade when installing solar panels and for major electrical permits (>= $4000) and when replacing the home's main electrical panel.

My final thought is around which contractors can work in Piedmont. I have run into multiple contractors who declined to do work in Piedmont for an advertised price and, in one case, demanded I pay their Piedmont business tax. I realize Piedmont would like to collect business taxes from contractors who do a lot of work in Piedmont. In the interest of increasing the supply of contractors in Piedmont, I would allow contractors who are registered in other East Bay cities to perform a certain number of jobs (e.g., two projects in 6 months) before they are required to register for a Piedmont business license. Piedmont still makes the permit fee and can demand a business license if the contractor tries to exceed the limit.

Thank you for your consideration.

Sincerely,

Hari Titan, Ph.D. (CompSci), M.Math
125 St James Drive