



Bureau of Planning and Sustainability

Date: September 14, 2021
To: Portland Clean Energy Fund Committee
From: PCEF Staff
Subject: PCEF heat hazard response program proposal

The extreme heat events of June 2021 are consistent with the worst-case climate modeling for the Pacific Northwest. Over the course of several days in June 2021, over 100 Oregonians lost their lives to extreme temperatures, with over 60 lives lost in Multnomah County. The [June 2021 heat wave](#) was the deadliest documented natural disaster in Multnomah County's history since white-colonial settlement¹. While it is difficult to predict the next future extreme heat event, there is a clear need to provide vulnerable Portlanders with access to cooling. The following memo, outlines a Portland Clean Energy Fund (PCEF) concept proposal for heat hazard response that aligns with [Portland City Code Chapter 7.07](#) (i.e., PCEF Code).

PCEF heat hazard response proposal:

Distribute and install 12,000 – 15,000 portable heat pump/cooling units over 3 to 5 years to vulnerable households, particularly those with seniors among our priority populations (low-income, BIPOC).

Rationale:

The proposal is a critical stop gap investment to reduce future heat-related tragedies². This approach contrasts with longer term strategies that are eligible in the primary PCEF request for proposal slated for late September 2021 such whole-home weatherization, ductless heat pump installations, etc. that take considerably more time for implementation, require significant outreach, have lengthy implementation timelines, and may be inaccessible for most renter-occupied households. Tree planting is an additional long term and complimentary solution outside of individual's homes that may provide meaningful shade 10-30 years after planting, depending on species. It is important to acknowledge that this proposal offers a cooling solution for our housed populations with consistent access to electricity. Numerous partners, including the City of Portland Bureau of Emergency Management, Multnomah County, and others are working on complimentary strategies for a wider range of solutions for future extreme heat events.

¹ For additional context please review [Multnomah County's Preliminary Review on Excessive Heat Deaths](#).

² The City of New York implemented a [similar program](#) last summer to distribute over 70,000 A/C units.

Proposal goals:

1. Address heat hazard needs for vulnerable people, particularly seniors, among our priority populations (low-income, BIPOC)
2. Use [PCEF Guiding Principles](#) in design and deployment
3. May/June 2022 implementation for initial distribution and installation, 3 to 5 year total deployment of 12k -15k portable heat pump/cooling units
4. Promote efficient installation, use and connection to programs to lower energy bills
5. Sustain long-term product life, usability & support

Approach:

In order to begin distribution of portable heat pump/cooling units prior to next summer, there are critical timing constraints related to equipment procurement due to supply chain lead times. The approach outlined below was crafted with stakeholder input, taking into account critical timing constraints (i.e., equipment orders placed by December 2021 for spring availability). The following are the key roles required for the implementation of the proposed program, however there will also be additional opportunities for organizations to get involved in outreach and promotion of the opportunity to the people that they serve.

Equipment Purchasing Partner: PCEF would seek a nonprofit organization that has relationships with retailers, manufacturers, installers and/or other pathways to acquire thousands of portable heat pump units on an ongoing basis throughout the program period.

Key Roles for Equipment Purchasing Partner

- Identify specifications of equipment to purchase, based on energy efficiency, features, and usability. City staff will collaborate in defining some parameters.
- Collaborate with City on evaluation of the total number of portable heat pump units to purchase, as well as potential for additional items such as air filtration units.
- Coordinate contracts with manufacturers, retailers, commercial entities, or other organizations to purchase portable heat pump/cooling units that provide efficient cooling.
- Coordinate delivery of the units through drop shipping to distribution partners, installers, or temporary warehouse space identified by the City. The Equipment Purchasing Partner is not expected to procure warehouse space.
- Develop maintenance, warranty, and equipment replacement procedures with partners, in order to maximize usable lifespan of equipment.

The equipment purchasing partner would be compensated through a grant for equipment procurement and administration costs to implement the acquisition and delivery of equipment.

Distribution and Installation Service Partners: PCEF would seek multiple nonprofit partners through an RFP process to serve a variety of roles in distributing portable heat pump/cooling equipment, setting up equipment in people's homes or apartments, providing information about how to use the devices, and potentially installing basic weatherization kits. These partners could be housing providers, social service organizations, tenant service organizations, and/or other community organizations that have the capacity to move, deliver and install equipment into people's homes. They could either do the distribution and installation services with staff resources or hire contractors to implement the installations.

Key roles for distribution and installation service partners (not all required of each partner):

- Coordinate with Equipment Purchasing Partner for number and type of units required
- Take delivery or pick up portable heat pump/cooling units, and store/manage inventory accordingly until installation. This may require unloading facilities and forklifts, pallet jacks or other freight management tools.
- Drop off cooling equipment to homes. This may require trucks, vans, and appropriate moving equipment to safely lift the cooling units up flights of stairs.
- Unpack the portable heat pump/cooling units and assemble.
- Install the portable heat pump/cooling units in the home, using basic tools, applying best practices to seal windows and ensuring safety.
- Provide information to recipient about how to use the unit, including any regular maintenance required (such as emptying water and changing filters)
- Install basic weatherization kits, where applicable and available
- Provide verification that unit (and where applicable, weatherization) has been installed and collect self-reported demographic information.
- Where applicable, check back annually to ensure that unit is operational

The distribution and installation services partners would be compensated through grants on a per-unit basis for the number of units installed or delivered. There may be additional payments on a per-home basis for additional services like weatherization installation.

Outreach completed to date:

Staff have conducted outreach with stakeholders representing affordable housing providers, culturally specific community-based organizations, direct service non-profits, electricity utilities, and tenant advocate organizations in order to identify cooling equipment needs, concerns, potential barriers, and potential impacts. A list of organizations contacted to date is listed at the end of this memo. Outreach to community groups continues and we anticipate additional interest in the program. All the organizations we have connected with have expressed clear need for the people they serve to access cooling and supported the development of this proposal. Organizations had varying levels of capacity and interest in directly implementing installation elements of the program, with some able to leverage staff resources to provide those services, while others reliant mostly on volunteers, who may not be able to enter people's homes.

GHG reduction, energy bill challenges and opportunities:

The following sections outline some greenhouse gas (GHG) reduction implications, energy bill implications and opportunities for both related to the proposal.

In order to calculate estimated energy usage cost for proposed heat pump/cooling units, we used National Oceanic and Atmospheric Administration data for Portland Airport which indicates 505 [cooling degree days](#) (CDD) based on 1991-2020 data records (note that we have seen 940 CDD reported for the 12 months ending 8/31/2021, which is likely the trending direction, though we could not find the source data). The following table outlines three use cases with paired units, along with a comparison of annual energy usage/cost for window units meeting federal minimum efficiency standards compared with a unit that has a significantly higher Energy Star rating (CEER rating of at 12.1 - 15).

Use case (square feet of cooling area)	Capacity (Btu/h)	Model A kwh	Model A \$	Model B kwh	Model B \$	Model B kwh savings vs. Model A	Savings opportunity %
100-150 sf (ex: bedroom)	5000	68	\$8.13	62	\$7.39	6	9.1%
150-250 sf (ex small living area)	6000	82	\$9.76	73	\$8.65	9	11.3%
300-350 sf (ex. larger living area/ open floor plan)	8000	109	\$13.01	80	\$9.54	29	26.7 %

GHG reductions implications:

We expect that this proposal, if implemented, would result in near term increases in GHG emissions associated with the use of electricity to cool spaces during hot days. However, if households choose to use the units for heating in cooler weather there may be a decrease in emissions during winter months as heat pump technology is significantly more efficient at heating than many common heating technologies (i.e., baseboard electric resistance and electric cadet heaters commonly found in multifamily housing and low-quality single-family homes). The following additional assumptions will impact overall GHG reductions:

- Greater acquisition over time of low-cost cooling equipment by households in the City which may be less efficient than those offered by the proposed program.
- Weatherization kits along with complimentary direct install (i.e., led lightbulbs, energy efficiency showerheads, faucet aerators) efforts for efficiency measures that result in additional GHG emissions reductions.
- Relationship development and lead generation with households that can be earmarked for future deeper efficiency investments.

An additional consideration for GHG reductions is that the City of Portland passed a Climate Emergency Declaration in 2020, which moved up the date for our goal of 100% renewable electricity to 2030. In the 2021 legislative session, HB 2021 also created tools for accelerated local decarbonization of the grid, including Municipal Green Tariffs. It is possible that Portland

could achieve 100% Renewable Energy for all residential customers during the next 3-5 years, which would mitigate GHG impacts of increased electricity load.

Energy bill implications:

Based on refined modeling, we believe the annual energy bill impacts will range from \$8 to \$20 for households receiving a single unit. The top range of the estimates represents projected costs for households that receive larger capacity units operating under a 1000 CDD scenario.

Additional GHG and energy bill reduction opportunities:

There are a variety of approaches that could be used to mitigate the impact of increased electricity use related to GHG emissions and energy cost for the people receiving portable heat pump/cooling units. The following table of options reflects some considerations of those tools which could theoretically be deployed as part of PCEF heat hazard response program.

Impact mitigation opportunities	Impact on GHG emissions	Impact on household energy costs	Additional Considerations
Purchase of Renewable Energy Certificate (REC) offsets	Scale of REC approach could zero out any potential GHG impact	No impact on electric bills	Costs of RECs vary based on which part of the US they are in, and the source.
Subsidization / Subscription to Community Solar Project (CSP)	CSP Subscription could yield net negative GHG impact, if sized greater than cooling load	Subscription would lower electric bills annually, more reduction in Summer, less in Winter	The Oregon CSP program launched in 2020, and there are currently only a handful of projects that are actively subscribing people
Connection with existing low-income energy assistance programs	No impact on GHG	Lower electricity bills on a one-time basis	Existing demand for these assistance programs has wait lists
Connection with low-income rate discount programs	No impact on GHG	Ongoing permanent electricity cost reduction	This program is still in development by Oregon PUC, and will not be available until later in 2022
Direct payment through bill credits or payments	No impact on GHG	One -time resource to	Accounting, administration and distribution

		mitigate electric bills	challenges to this approach
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It is important to note that several of the impact mitigation opportunities will not be available in the near term or are over-subscribed, but offer longer term solutions for consideration.

Heat hazard response program cost estimates and context

In estimating the costs for a potential heat response program, the largest cost would be associated with the purchase of the equipment. While we expect some cost savings associated with the bulk purchase of equipment, it is difficult to quantify the level of discount. Staff estimates are based on retail equipment costs. Lower cost A/C window units cost approximately \$300, and dual use portable heat pumps cost approximately \$600. Working with an Equipment Purchasing Partner, we would develop a mix of technologies, focusing on the most efficient equipment. Estimating an average cost between \$400 to \$500 per unit, we would expect equipment cost to range from \$4.8 million to \$7.5 million for acquiring 12,000 -15,000 portable heat pump/cooling units. Factoring in administration, management, and logistics support costs for equipment purchasing, we anticipate budgeting \$1.5 to \$2 million annually for up to 5 years totaling approximately \$9 million for equipment acquisition and related costs.

The costs associated with distribution and installation would be an additional per-unit cost, to be determined by the responses to the RFP for Distribution and Installation Partners. Staff expect that some organizations (like affordable housing providers) may have lower distribution costs per unit and greater simplicity of installation, while other community organizations may require more resources to deliver and install the units. Initial conversations with stakeholders indicate that these costs may range from \$50 -\$250 per unit, yielding a potential range of \$600,000 to \$3.7 million for installation. We will have greater certainty on costs once we get responses from interested organizations about the number of units they seek to distribute and their costs associated with distribution.

We expect the funds for this proposal to be appropriated with separate City Council budget action as to not impact the planned \$60 million RFP to be released later this month. While we still do not have certainty around the value of 2019 [Clean Energy Surcharge](#) (CES) collections, we have been collecting more than two years of CES funds and are about to solicit proposal for our first funding round at \$60 million. As a result, we do have a substantial fund balance. We anticipate grant funding availability in the next few years will be upwards of \$80 million annually and expect to communicate this with greater certainty shortly as we get greater resolution into annual CES collection volume. This is all to say that this proposal is likely to represent a small fraction of future annual budgeted grant funding.

List of organizations providing feedback and input in heat hazard response concept as of 9/14/21:

BridgeMeadows	Latino Network
Bureau of Emergency Mgmt	Meals on Wheels
Central City Concern	Multnomah County
Community Alliance of Tenants	Pacific Power
Community Energy Project	PCRI
Energy Trust of Oregon	Portland Housing Bureau
Hacienda CDC	Portland General Electric
Habitat for Humanity	Portland Tenants United
Home Forward	Taking Ownership PDX
Innovative Housing	Verde