

Illinois Energy Efficiency Stakeholder Advisory Group

2020 SAG Portfolio Planning Process
Proposed Energy Efficiency Ideas Template

Submitter Contact Information

Name: Margaret Garascia

Organization: Elevate Energy

Website: www.elevateenergy.org

Email: Margaret.Garascia@elevateenergy.org

Phone: 773-922-3020

Energy Efficiency Idea Questions

Please check the boxes below to identify 1) the type of idea; 2) which Illinois utility or utilities will be impacted by the idea; and 3) which EE sector the idea impacts.

Check	Type of Energy Efficiency Idea
<input checked="" type="checkbox"/>	New Measure or New Program Idea
<input type="checkbox"/>	Proposed Program Approach
<input type="checkbox"/>	Innovative Idea

Check	Illinois Utility Impacted by Energy Efficiency Idea
<input type="checkbox"/>	Ameren Illinois
<input checked="" type="checkbox"/>	ComEd
<input type="checkbox"/>	Nicor Gas
<input type="checkbox"/>	Peoples Gas & North Shore Gas
<input type="checkbox"/>	All Illinois Utilities

Check	Energy Efficiency Sector Targeted by Energy Efficiency Idea
<input type="checkbox"/>	Residential Customers – Single Family (non-income qualified/income eligible)
<input type="checkbox"/>	Residential Customers – Multifamily (non-income qualified/income eligible)
<input type="checkbox"/>	Residential Customers – Single Family Income Qualified/Income Eligible
<input type="checkbox"/>	Residential Customers – Multifamily Income Qualified/Income Eligible
<input type="checkbox"/>	Small Business Customers (commercial & industrial sector)
<input type="checkbox"/>	Medium/Large Business Customers (commercial & industrial sector)
<input checked="" type="checkbox"/>	Other (research & development, emerging technologies, market transformation)

Additional Questions

1. **Description of Idea:** Describe the proposed idea, including the purpose of the suggested idea and rationale. Describe whether this is an idea that could be implemented in an existing EE program, or whether the idea involves establishing a new measure or program. Please indicate whether additional research may be required before implementation.

Questions to consider: What issue will this proposed change resolve? Will the proposed change increase participation and result in increased energy savings? Will this reduce costs? Will this increase customer satisfaction? Will this help achieve statutory goals? Will this help increase program penetration?

Elevate Energy proposes an R&D pilot program to conduct whole-building electric modernization and weatherization retrofits for rural income-qualified electric customers currently using electric resistance, propane, or firewood for heat and hot water. The pilot will seek to install up to 50 integrated space and water heating integrated heat pump systems (systems that capture waste heat from space cooling in the summer for utilization as domestic hot water). This technology is common for ground source heat pumps but newly developing in air source applications. The pilot will focus on rural low-income customers as they stand to benefit the most from building comfort upgrades.

An initial community has been identified in the Village of Hopkins Park and the surrounding Pembroke Township, in Kankakee County, in ComEd’s service territory. Hopkins Park is a very low-income rural community without natural gas service; heat is provided by electric resistance, propane, and firewood. Per [2010 census data](#) the population of Pembroke Township was 2,140, with 1,062 housing units; Hopkins Park pop 603, with 290 housing units. The density is rural: 20 housing units per square mile in the township, and 77 in Hopkins Park. Hopkins Park itself is thus spread over about 4 square miles. Hopkins Park is majority African American. [2018 census updates](#) indicate median property values of \$47,000 and average household income of \$18,500.

By replacing electric resistance, propane, and firewood as primary heating sources, the pilot program would:

- reduce total energy costs for electric customers;
- reduce site energy consumption;
- develop superior alternatives to a [proposed \\$8.2 million gas pipeline expansion project](#), as well as additional in-home gas conversion costs;

- reduce health and safety risks of current heating methods;
- improve building comfort by improving air sealing and cooling;
- improve customer satisfaction; and
- position the community in the vanguard of climate action and carbon responsibility.

To the extent residents are not already using efficient heat pump technology, the pilot would position the community to leapfrog gas infrastructure investments and begin transitioning directly to low carbon intensity heating methods. The pilot would complement existing climate policy in Illinois—see, for example Governor Pritzker’s [Executive Order](#) committing Illinois to the goals of the Paris Climate Accord. Conversion to heat pumps, if properly measured and evaluated against propane, electric resistance, and potential gas pipeline expansion costs, will provide high savings potential for Pembroke and potentially additional rural low-income communities across Illinois.

The recommended pilot would include:

- weatherization or comprehensive building envelope air sealing and insulation improvements as appropriate to housing stock;
- electrification of the heating systems via ducted or mini-split air-source heat pumps;
- electrification of the domestic hot water systems via a heat pump water heaters;
- electrification of the cooking systems in-unit;
- upgrades to the electrical panel (if necessary);
- workforce training for contractors unfamiliar with electrification retrofits;
- incorporation of grid-enabled technology and ComEd’s Hourly Pricing and Time of Use rates, as applicable.

This pilot would require new measures, or the reintroduction of previously phased-out measures. The TRM does not currently have a category for integrated space and water heating air source heat pumps. Additionally, ComEd recently removed incentives for heat pump water heaters due to low demand and does not provide incentives for stoves (either induction or resistance). Integrated air source heat pump program space and water heating incentive levels would require significant increases in order to succeed among income qualified residents.

The program would be implemented as a stand-alone pilot. The pilot would select two contractors, a single heat pump contractor and a single weatherization/building envelope contractor, to capture efficiencies of scale in procurement and installation and to develop best practices.

Subject to confirmation, approximately 30% of the housing stock is manufactured housing. Research and review of best practices in weatherization and envelope improvements in manufactured housing may be appropriate, however, at the proposed scale of 50 dwelling units, the pilot program can work around manufactured housing stock if necessary.

2. **Implementation:** How will this idea be delivered to the target market? Describe marketing strategies used to reach the target market and minimize market confusion.

An advantage of this project is the strong community identity in Pembroke, which will facilitate communication of the program offerings. Elevate will partner with local government officials, churches, and other community organizations to develop further contacts into the community. Further, the program goal of 50 homes is a very manageable scale in a small community of 1,000 homes.

3. **Background:** Describe where the idea originated from, including whether this idea has been successfully implemented in other jurisdictions. Provide specific background information that will help utilities and SAG participants understand the proposed idea.

Questions to consider: In what jurisdiction has this idea been successfully implemented? Do you have information on eligible customers, participation achieved, and/or savings achieved? Do you have access to reports describing the successful idea / program approach?

The 2018 TRM includes the assumption that integrated space and water heating for ground-source heat pumps produces a 44% annual reduction in domestic hot water energy consumption as the systems capture waste heat from summer cool and utilize that heat for hot water. However, this technology is not widely developed for air source heat pumps even though there is no clear technical barrier. A pilot project to demonstrate a decent number of systems would allow OEMs the opportunity to further develop such systems in a cold climate.

In terms of choice of Pembroke, because of the extreme poverty and lack of economic development in the area, the community has attracted attention for many years, though major initiatives have failed to materialize, often because of the lack of local matching funds. The broad attention garnered by the pipeline proposal presents a strong opportunity to demonstrate a more cost-effective and carbon-conscious path.

The State of California has considerable experience with a similar situation, across 11 disadvantaged communities in the San Joaquin Valley.

In 2015, a California state law directed the PUC to investigate options to bring more affordable energy options to disadvantaged communities in the San Joaquin Valley. The region is low-income, with a large Hispanic population, centered in a highly productive agricultural area which, like Pembroke, lacks natural gas, and relies on propane and wood for heating. The CPUC selected 11 communities for pilot projects. There was very heavy community engagement, including CPUC-led workshops within each community. In the 11 communities, the result was 10 electrification projects and one natural gas extension project. The communities with electrification will receive efficiency and appliance upgrades fully paid for by the utilities. In some communities, community solar installations will be developed. The programs have been approved and utilities are in early stages of implementation.

Similar to Pembroke, the constraints on the ability of the low-income population in the San Joaquin Valley to finance upgrades was a major challenge. In California, the solution was implementation measures fully paid for by the utilities. The proposed gas pipeline expansion project in Pembroke, and related legislation (SB 3696) similarly envisions existing customers of Nicor providing enormous subsidies for the Pembroke customers. This electric modernization pilot would need to be creatively evaluated in a similar context, perhaps as emerging technologies for low income customers.

Further background:

An Op-Ed from [California PUC Commissioner Guzman Aceves describes the results.](#)

California PUC overview page: <https://www.cpuc.ca.gov/SanJoaquin/>

Full order from PUC approving the programs:

<http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M252/K522/252522682.PDF>

- Idea Impact:** Provide additional information on the customer segment that will be targeted with the program idea, including how and why this idea will have a positive impact on customers participating in Illinois EE programs.

Questions to consider: What level of impact will this idea have on current EE programs? How much additional market share do you estimate this change will impact?

The pilot program offers a strong opportunity to develop technology to avoid significant summertime heating load. Integrated space and water heating and cooling offers high potential adoption in new construction and renovation sectors as well. Developing air source heat pump products to offset 44% of annual residential domestic hot water through recovery of waste heat is clearly a large potential savings opportunity, particularly in light of anticipated future growth of the air source heat pump space heat market share.

Through choice of community, the pilot program is also a strong opportunity to provide rural, income-eligible, electric modernization benefits and a perhaps unique opportunity to do so while also addressing equity concerns for a rural African American population in the ComEd territory.

For a community with an average household income of \$18,500, the pilot program would:

- reduce total energy costs for electric customers;
- help develop methods that could ultimately save millions of dollars in gas infrastructure expansion costs, as well as additional in-home gas conversion costs;
- reduce health and safety risks of current heating methods;
- improve building comfort by improving air sealing and cooling; and
- improve customer satisfaction; and
- position the community in the vanguard of climate action and carbon responsibility.

5. **Duration:** Is this idea intended to be offered for the duration of the 4-year EE Plan or as a pilot measure or program?

We propose that this as a pilot program. The practicality of expansion across the rest of the community and to other rural low-income communities would be a key consideration during pilot evaluation.

6. **Estimated Budget:** Provide the total estimated budget for each program year (2022 – 2025).

The pilot preliminary estimated budget is below \$1 million for priority measures. See below for program detail. The program priorities are the improvement of air sealing and the deployment of heat pumps for space heating and hot water. Induction cooking will be evaluated as resources allow.

7. **Estimated Participation:** Provide participation totals for each program year (i.e. number of measures installed, number of customer participants, etc.)

Participation for induction cooking is assumed to be 20% of total participating units, and would be provided as a health and safety measure. Induction cooking includes cookware and induction range and convection oven. As noted above, induction cooking will be evaluated as resources allow.

Measure	Unit cost	Total Cost @ 50 Units
Air Source Heat Pump with desuperheater and additional storage tank	\$12,000	\$600,000
Heat Pump Water Heater	\$1,700	\$85,000
Weatherization	\$4,000	\$200,000
Electrical Upgrades, other health & safety	\$1,500	\$75,000
Induction Cooking—assume 10 of 50 units	\$1,300	\$13,000
Total w/o Cooktops	\$19,200	\$960,000
Total with Cooktops—assume 10 of 50 units	\$20,500	\$973,000

Sources

If any sources will be useful to Illinois utilities in reviewing ideas, please either provide links within this template or send attachment(s) to the SAG Facilitator with the Energy Efficiency Idea submittal.

See links in text above.