

**DOCKETED**

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*Comment Received From: Max Henrion*  
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**Need for an Economic evaluation tool for heat pumps to  
accelerate adoption**

*Additional submitted attachment is included below.*



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Commissioner Andrew McAllister  
California Energy Commission  
1516 Ninth Street  
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April 23, 2022

**Subject: Lumina comments on Staff Workshop on Heat Pump Goals and Supply Chain:  
Economic evaluation tool for heat pumps**

Dear Commissioner McAllister:

On behalf of Lumina Decision Systems, Inc, we thank the California Energy Commission (CEC) for the opportunity to comment on the Staff Workshop on Heat Pump Goals, Supply Chain, and Program. We greatly appreciate the CEC hosting a workshop on this topic and for its leadership in accelerating the deployment of heat pumps.

### Accelerating adoption via public understanding of heat pumps

A major obstacle to accelerated adoption is that most homeowners, building managers, and even many HVAC installers have limited understanding of heat pumps and their economic advantages. Indeed, it is challenging to estimate the operating costs of heat pumps relative to heating systems using natural gas or propane, or even electric resistance heating. Calculation with time-of-use tariffs and tiered pricing common in California require hourly analysis based on hourly temperature profiles for the locality. Additional complexity arises with thermal energy storage, needed to shift electricity usage away from the hours of peak demand, and so reduce stress on a grid increasingly powered by variable renewables.

### The need for a better savings calculator

Existing heat pump cost calculators are either simplified tools designed for consumers that ignore these key factors and give unreliable results, or complex tools designed for professional analysts that require special expertise and large amounts of data. For HVAC installers and heat pump distributors to provide effective and reliable advice to prospective customers, there is an urgent need for a different kind of calculator that is based on a comprehensive model that gives reliable results for estimating cost savings while being easy to use with easily available data.

Such a tool should enable analysis of a wide range of heat pump equipment in comparison of a wide range of existing heating equipment. It should cover ducted and ductless heat pump installations, packaged and split units, to replace furnaces with air ducts, hydronic systems, as well as room-based electric or gas heating systems. Ideally, the tool would include performance specifications for a wide range of heat pump products, for water heating and space heating. To evaluate the lifetime value of such systems, it should include forecasts of future electricity and gas prices, as well as projected reductions in carbon intensity of electricity to estimate effect on GHG emissions.

## The Need for a Heat Pump Calculator

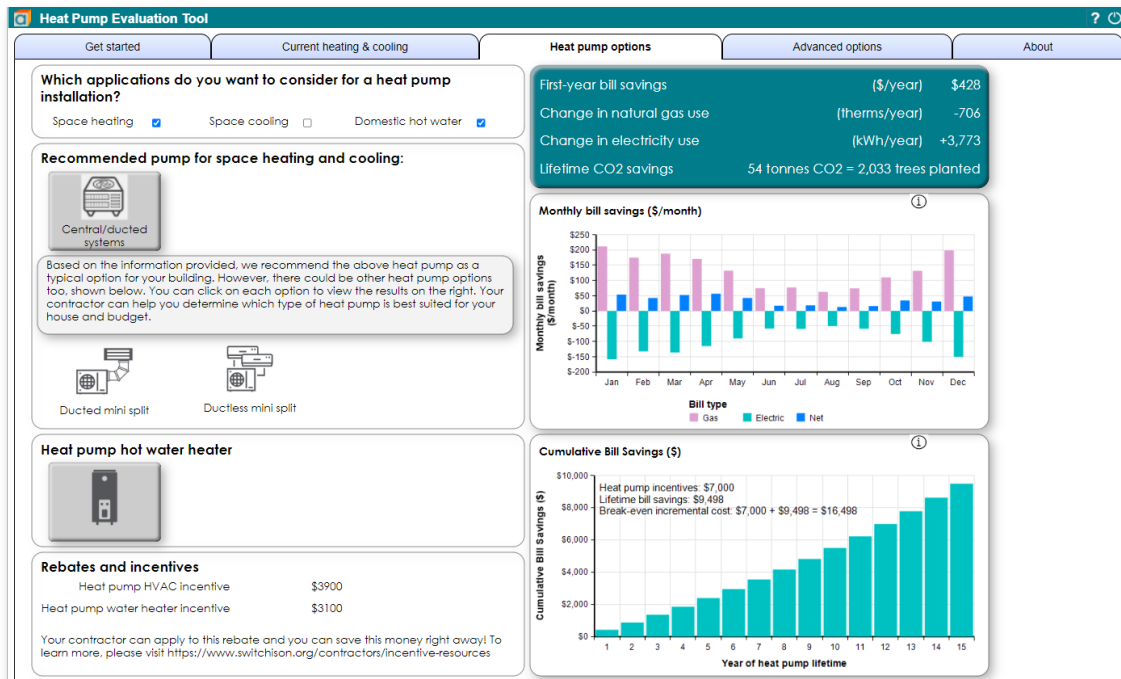
### An example Heat Pump Evaluation Tool

Lumina has developed a prototype system of this type using our Analytica Cloud Platform with support from California's Central Coast Community Energy (CCCE). This tool is now being tested by customers of CCCE.

The screenshot shows the 'Current heating & cooling' tab of the Heat Pump Evaluation Tool. It is divided into three main sections: 'How do you currently heat your home?', 'How do you currently cool your home?', and 'Tell us about your hot water heater.' Each section contains a series of questions and options for selection.

- How do you currently heat your home?**
  - Energy type: Electricity (selected), Natural gas
  - Heating system: Central heating with gas furnace and air ducts, Gas boiler and hydronic hot water pipes, Gas heaters in rooms
  - Efficiency level: Low, Typical (selected), High
  - Thermostat temperature: 72°F
- How do you currently cool your home?**
  - A/C? Yes, No (selected)
  - Cooling system: Air conditioner, central/ducted, Air conditioner, room/window, Evaporative cooler
  - Efficiency level: Low, Typical (selected), High
  - Thermostat temperature: 74°F
- Tell us about your hot water heater.**
  - Energy type: Electricity, Natural gas (selected)
  - Main method: Gas storage water heater, Tankless gas water heater
  - Efficiency level: Low, Typical, High

Users may specify their current space heating and cooling system and water heating for comparison with heat pump options.



The Heat Pump Evaluation tool recommends heat pump systems appropriate for the building, identifies available rebates and incentives, and estimates monthly and annual bill savings, and lifetime CO<sub>2</sub> emissions savings. Advanced options are available for more experienced users.

## The Need for a Heat Pump Calculator

This prototype is for customers of CCCE. It lets users select their zip code in this area so that the tool can use appropriate hourly climate data, and electric and gas rates available in the area.

Those interested may review and use this Heat Pump Evaluation Tool at <https://heatpumpevaluation.com/heatpumpcalculator> along with background educational material at <https://heatpumpevaluation.com/>

## Who are we?

Lumina Decision Systems is a software and consulting firm based in Campbell, California. We specialize in building decision-support applications for energy and climate decisions. Our Analytica software is widely used to create and run energy and climate models by many consulting firms, energy companies, and government agencies, including CEC, many California utilities, several National Laboratories, US DoE, and the World Bank.

We believe that software calculator tools as we have described and associated educational material have the potential to dramatically expand public understanding and evaluation of heat pumps. Such a tool should be a key element of a program to accelerate heat pump adoption to meet California targets for electrification. We appreciate the chance to share our perspective.

Sincerely



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