

Bangor Hydro Kiosk

Presented to

Bangor Hydro Electric Company

DRAFT

Proposed by

ASAP Media Services
University of Maine

June 20th, 2012

Introduction

Bangor Hydro Electric Company (Bangor Hydro) is engaged in educating its 100,000 customers in central and eastern Maine and the general public to the benefits of heat pump technology. Using digital kiosks and web portals, Bangor Hydro plans to communicate the greater efficiency and cost-effectiveness of air-source and geothermal heat pumps over traditional oil and gas systems. To promote adoption, Bangor Hydro has specifically targeted high-school students and tradeshow attendees as key audiences for promoting heat pump technology in the region. Bangor Hydro has approached ASAP Media Services (ASAP) as a potential creative collaborator who brings fresh ideas to its proposed three-phase project. In response, ASAP offers the following proposal brief to detail the scope and nature of an effective collaboration.

As future homeowners themselves, the group at ASAP is excited at the opportunity to work with Bangor Hydro to create tools that help customers develop a better understanding of alternative heating technologies. ASAP is eager to research heat pump technologies for this project not only because of the benefit to Bangor Hydro, but also because of the broader benefits this information will have on the surrounding community. The variety of potential projects, from kiosks to web applications, will present ASAP with a chance to unleash many creative ideas and solutions to the same concepts and goals. ASAP also shares in Bangor Hydro's forward thinking approach to the future of a cleaner, "greener" society and strives to become a leader in promoting this approach. The similarity in interests of both Bangor Hydro and ASAP will result in more dynamic discussions, a more concrete conceptual foundation, and, ultimately, a more impactful and beneficial collaboration.

Overview

Bangor Hydro has approached ASAP to research, design and fabricate a three-phase project focused on communicating the benefits of heat pump technology to a variety of audiences:

Phase 1 of the project will culminate in the design and development of a portable, educational kiosk focusing on air source heat pump technology, divided into sections reflecting research categories. Each section will provide textual information and interactive activities. The kiosk will be used in multiple venues, e.g. high schools and trade shows, to stimulate interest and promote awareness. Phase 1 will provide the design foundation for Phase 2 and 3.

Phase 2 includes design and development of a web-based application to reside on the Bangor Hydro website. While providing much of the information presented in the Phase 1 kiosk, the web application will further encourage users to learn about air source heat pumps. Unique features include tools empowering Bangor Hydro customers to estimate the costs of installing and maintaining an air source heat pump in their own home, both in the short term (installation) and long term (maintaining), compared side by side with the

costs of their current heating method. The web application will provide a compelling view of the benefits of converting to heat pump technology.

Phase 3 of the project will involve designing and developing a permanent kiosk to be located in the front lobby of a new Bangor-area building installed with geothermal heat pumps to control temperature. The kiosk will present comparative information about geothermal pumps and unique, building-specific information using data from meters placed throughout the building for demonstrating energy usage and efficiency in real-time. Additional tools could be created based on data such as occupant information and floor plans, turning the kiosk into an incredible resource for both visitors and employees or occupants.

The proposed project requires a significant research component *prior to* all design and fabrication of any phase. Up-front work will include research to understand topics minimally including

- The *history of heat pump technology* in various contexts, e.g. within the history of dominant traditional fuel resources and emerging interest in alternative energy resources
- The *science of heat pump technology*, from extraction to building temperature modification, including the physics behind the technology and effective means for visually and interactively conveying the relevant scientific concepts
- The *economics of heat pump technology*, at micro- and more macroeconomic levels, including tools and strategies for effective analysis and assessment of associated costs (initial and ongoing, short- and long-term, individual and community, etc.)
- The *environmental impact of heat pump technology*, as compared to other methods of heating and cooling, such as gas and oil, and in terms of concepts of green efficiency, with possible “national security” impact
- The *installation of heat pump technology* associated with air-source and geothermal systems, requirements for homes and industrial buildings, major steps in simple terms with the aid of graphics, integration issues, etc.

Such research is needed to accurately inform and mediate understanding of heat pump technology throughout all phases of the project. This research component may either be performed by ASAP to develop adequate content knowledge or may be conducted by Bangor Hydro and provided to ASAP. Project estimates reflect choice of option.

Phase 1: Portable Educational Kiosk

The information and activities presented in this kiosk will focus on air-source heat pump technology because this type of heat pump will be most heavily marketed to homeowners. The kiosk will be built using open-source programming environments, primarily to facilitate the touch functionality necessary for this project. A kiosk is a platform that allows for interactivity and it is important that this project takes advantage of that. Developing touch activities relevant to the information presented in each module

adds a plethora of interactivity to the kiosk that a simple presentation does not accommodate, and as such will provide users with an even better understanding of heat pumps. The use of open-source programming environments also opens doors for future development of mobile applications, as well as sets the stage for the web-based application described later on. A dynamic, engaging kiosk will present users with critical information through an effective medium that promises to seize attention and embrace a fun, educational experience.

Tools and Presentations

Each section of the kiosk will consist of both textual information and interactive media, ensuring that users can explore content instead of just reading through it. This exploration will provide users with a better understanding and greater appreciation for heat pump technologies. Anticipated tools and presentations include:

- **Real World Connections** – Current heat pump owners would be interviewed to determine what factors motivated them to install a heat pump, with completed interviews being viewable on the kiosk.
- **Real-time Comparisons to Other Energy Sources** – This would be a tool where homeowners could get a general idea of how much money installing a heat pump would save them each year.
- **Animations** – Animations would present users with visuals that would enhance their understanding of heat pump technology.
- **Simulations** – Users would modify a constructed heat pump simulation to determine how various scenarios would affect it. This physical manipulation of a heat pump system would increase a users understanding and appreciation for the technology.
- **Interactive Models** – All models presented in the kiosk would be interactive, giving a user the opportunity to explore an aspect of heat pumps in more detail, increasing a users understanding and appreciation for the technology.
- **Manufacturer Finder** – A tool that would help customers find manufacturers and installers of heat pumps in their area. This information will most likely be pulled from Bangor Hydro's website.

Primary Audience(s)

- **High school students** - with the high level of understanding and appreciation provided by this kiosk, students will be encouraged to share their discoveries to friends and relatives, potential homeowners who may be interested in alternative heating methods.
- **Trade Show Attendee's** - seeing the strong initiative of Bangor Hydro to promote heat pump technology would encourage more of these businesses to open up branches in Maine and create new partnerships.

The proposed sections of this phase (along with individual production times) are listed below:

Research

- ASAP will research existing educational kiosks as well as educational tools that focus on heat pump technology (approx. 100 hours)

Conceptualization

- This includes designing a layout for the kiosk, determining what and how information should be provided within each section, and designing touch activities specific to each module (approx. 125 hours)

Development

- Creating the content and interfaces that will be presented in each section. Developing video content (setting up interviews, shooting and editing video). Programming the interactive activities within each module (animations, simulations, models, etc.) (approx. 400 hours)

Testing

- Each module will be user tested after completion to ensure ease of use and success at conveying information (approx. 35 hours)

Total Hours: 660

Phase 2: Web Application

In addition to existing content developed in Phase 1, a new tool will be added to the web application that will give customers an approximate cost for installing and maintaining a heat pump in their home. Customers using this tool will enter relevant home information along with their current energy use and costs (usage and cost can be pulled from an existing Bangor Hydro database). These values are entered into an equation that determines approximate short (installation) and long (maintenance, usage) term costs if the home was fitted with a heat pump. This information can be compared to other heating and energy methods, culminating in an impactful tool for Bangor Hydro customers.

Primary Audience(s)

- **Bangor Hydro Customers** - homeowners are always on the look out for choices they can make that will improve their quality of life. Many times, these decisions are financially driven and revolve around saving money both in the long and short terms. With the help of the proposed web application, these homeowners would be able to determine the approximate long and short-term costs associated with installing a heat pump in their home.

The proposed sections of this phase (along with individual production times) are listed below:

Research

- Bangor Hydro will work with ASAP to research the kinds of data and equations necessary to calculate and compare different methods of heating (approx. 30 hours)

Conceptualization

- This includes designing the layout and functionality for the comparison tools as well as determining how the comparisons will be presented (visualizations, text, etc.) (approx. 75 hours)

Development

- Creating the interface and graphical elements for the comparison tool. Programming the comparison tool as well as programming the single-touch version of the kiosk activities (approx. 120 hours)

Testing

- Each module will be user tested after completion to ensure ease of use and success at conveying information (approx. 15 hours)

Total Hours: 240

Phase 3: Permanent Kiosk

A permanent kiosk will be installed in the lobby of a newly constructed building in Bangor that utilizes geothermal heat pumps. The kiosk will include similar sections as the ones described in Phase 1, although the content presented will focus on geothermal heat pumps. Additional tools will allow users to view the building's current energy usage and savings over time by pulling data from the building's meters and other gauges in real-time. Anticipated building-specific tools, depending on what kind of technologies are installed, are described below:

- **Live Area Temperature Control** – The energy required to keep an empty area at a consistent temperature of seventy degrees is much different than if the same area was full of people. Using heat sensors, temperature could be analyzed in real-time and automatically maintained through out the day, cutting down on energy costs. This information could be displayed on the kiosk in the form of heat maps as well as numeric visuals presenting thermostat readings alongside what temperature the area “feels” like.
- **Area Specific Energy Use** – Different areas of a building use varying amounts of energy depending on the purpose and amount of occupants. Using real-time building data from meters, a tool could be created that displays area-specific energy usage including but not limited to water and electricity. This information

could be mapped onto a building floor plan according to the area where the data is coming from. This tool would give owners a sense of where the most energy is being used and would give occupants an incentive to cut their energy use.

- **Similar Building Comparison** – Organizations that strive to be “green” in today’s society are held in high regard. This building plans to demonstrate its desire to be “green” by using geothermal heat pumps as its primary heating and cooling method, a method that sets it apart from many buildings in the area. To demonstrate the green efficiency of this building, a tool could be developed that compared its energy costs and emissions to similar local buildings. This sort of tool would present this building as a model for the future in the public eye and encourage other buildings to adopt “green” alternatives to their current heating method.

The information necessary to create these tools could be accessed live from the building and presented in real-time through the kiosk.

Information not related to energy usage could also be presented through this kiosk. For example, a detailed floor plan could be displayed that shows various sections or departments of the building. This could include a list of employees or occupants in each section as well as their job title and job description. The kiosk could also provide information regarding the general purpose of the building as well as any upcoming events that may be taking place there. The amount of features the permanent kiosk could provide is seemingly endless, and is only limited by what sensors and meters are installed in the building.

The proposed sections of this phase (along with individual production times) are listed below:

Research

- ASAP will work with building representatives to determine what type of meters, sensors, and other technologies are available to pull data from. ASAP will also research what types of general tools will be ideal for this type of permanent kiosk (approx. 60 hours)

Conceptualization

- This includes designing the layout and functionality of the new tools as well as how they are presented to the user (approx. 125 hours)

Development

- Creating the interface and graphical elements for each tool presented on the kiosk. Programming these tools to pull data from sensors and meters within the building and present the information in a organized, understandable way (approx. 200 hours)

Testing

- Each module will be user tested after completion to ensure ease of use and success at conveying information (approx. 30 hours)

Total Hours: 415

Cost Analysis

The proposed project, depending on whether research is performed by ASAP or performed by Bangor Hydro and if all previously mentioned features are designed and implemented with visual styling, will take 1,465 hours to complete. ASAP Media Services' hourly rate is \$35. A breakdown reflecting the above estimate is as follows:

	ASAP leads research*	Hour x Costs
Heat Pump Research	150 hours	\$5,250.00
Phase 1	660 hours	\$23,100.00
Phase 2	240 hours	\$8,400.00
Phase 3	415 hours	\$14,525.00
Total	1,465 hours	\$51,275.00

* Should Bangor Hydro choose to provide the heat pump research, total hours will fall to 1,340 and total cost will fall to \$46,900.00

Conclusion

ASAP Media Services will assist Bangor Hydro in effectively disseminating heat pump information to Bangor Hydro's costumers through the development of a kiosk and web application. Users will be able to easily access and interact with modules to explore facets of heat pump technology such as history, physics, installation, economics, and environmental impact. This capacity will increase costumer energy awareness and improve customer-relations as well as promote a solid understanding of the information at hand to future customers. It will also encourage the use and promotion of the heat pump to those already working and established within the industry.

By working to empower consumers with the necessary tools to understand and explore energy information, Bangor Hydro has demonstrated its commitment to its costumer base in numerous ways including, but not limited to, anticipating the future of energy consumption. ASAP Media Services shares Bangor Hydro's forward-looking perspective regarding technology and is excited to partner with Bangor Hydro to assist with its goal of exploring and building the future of technology to both design and realize the world of tomorrow.

Sincerely,

ASAP Media Services

DRAFT

Agreement

Original graphical elements created by ASAP specifically for the application becomes property of Bangor Hydro once payment has been delivered. ASAP shall retain ownership rights of interactivity designs and reserves the right to reference and reuse source components (void of Bangor Hydro's styling, data, or information otherwise) in future projects.

We hereby agree to these terms, conditions and scope of work between ASAP and Bangor Hydro concerning research and development of the kiosk and web application.

_____	_____	_____	_____
	Date	Mike Scott	Date
Bangor Hydro		ASAP Media Services	