



### **Cambridge Gridworks Project Description**

Emily Chan, Lizzie Downing, Paloma O'Connor, Kabir Singh

#### **Problem**

The problem we are addressing is the contribution of electric energy to the emission of greenhouse gases. Cambridge emits two million tons of carbon dioxide a year, and according to the federal government's New England Regional Assessment, temperatures in the New England area will rise by 6 to 10 degrees Fahrenheit as a result of greenhouse gas global warming effect. Buildings account for 80 percent of Cambridge's total carbon emissions, and electricity is the principal source of energy within them, meaning addressing electricity use is crucial for addressing emissions.

#### **Examples**

Smart grids have been implemented in every continent on the planet except Antarctica. Europe has the largest abundance of smart grid projects, as there are numerous independent, national and multinational companies and utilities that have implemented both pilot programs and potentially permanent programs across the continent. We are using Fort Collins, CO as our model, since it is one of the few cities in the U.S. which has a still successful smart grid program. It has reduced utility bills and energy usage successfully. Fort Collins' population is also not too much higher than Cambridge, and the climates are on average, within similar ranges.

#### **Smart Grids Explanation**

A smart grid is a modernized electrical grid that utilizes communication technology to maximize efficiency. In our current energy grid, the power source simply pumps energy into the grid, without considering how much energy is actually being used - a one-way street from the power plant to the consumer. A smart grid uses Advanced Metering Infrastructure

(AMI) to coordinate power production and power consumption and allow houses to “talk back” to the grid, allowing the grid to automatically change the flow of energy into the grid depending on demand - a two-way street. This delivers energy more efficiently and reliably, facilitates the integration of renewable energy into the power grid and the use of electric vehicles, gives consumers greater control over their energy use through dynamic pricing, reduces carbon emissions, and promotes growth in the energy sector.

#### Implementation

We are currently contacting local utilities in the greater Boston area (NSTAR and National Grid) and outside companies that may be willing to help install and monitor the smart grid in Cambridge. After regulatory approval from the city government, we can begin the early stages: surveying the area and early order of equipment. By 2016, we can begin the initial field trials, installing the first 250 meters. This would be followed by a first release in the summer and the beginning of major installation of grid devices. By 2017, installation of smart meters in individual buildings would begin. From 2018 to 2020, the system would be operated and improved upon.