

Information about Warrant Article #15 – ZERO ENERGY TOWN MEETING BYLAW

Submitted by Lee Jennings et al., for the Amherst Zero Energy Public Buildings Working Group of *Mother's Out Front* and *Climate Action Now*
Please visit our website at <http://zeroenergyamherst.weebly.com> for additional information including more FAQ, a helpful video, and many Zero Energy building examples.



WHAT IS A ZERO ENERGY BUILDING?

A zero energy building produces as much energy as it consumes over the course of a year. These buildings achieve Zero Energy (referred to as ZE or Zero Net Energy) through high levels of energy efficiency, and through the addition of onsite renewable power generation.

WHAT BUILDINGS ARE WE TALKING ABOUT AND WHY PUBLIC BUILDINGS?

This bylaw refers to all new buildings and new building additions built by and for the Town of Amherst that cost more than \$1 million. Renovations are not included. The public sector has a responsibility to “lead by example”. The goal is to have energy efficient buildings of all sorts become the norm in our communities. Amherst has an opportunity to lead the way.

WHY DO WE NEED ZE BUILDINGS?

Buildings consume 54 percent of energy used annually in Massachusetts. Emergency measures must be taken to prevent catastrophic increase in global warming that will trigger irreversible changes to our biosphere. Energy efficiency improvements in design and operations substantially reduce the environmental impacts associated with buildings. With rising energy costs, and increasing climate-related impacts and natural disasters, ZE buildings help reduce our demand for fossil fuel burning and provide more resilience to climate impacts.

WHY DO WE NEED A BYLAW?

Getting to zero energy requires an unwavering commitment from the start of the building feasibility process. By enacting a bylaw we can guarantee that this performance standard is included in decision-making and that it cannot be “value engineered” as the project evolves.

WHAT CHANGES DO WE PROPOSE TO THE BYLAW AS SUBMITTED?

An emergency generator is allowed as an exception.

Off-site dedicated renewable energy systems are allowed.

ARE ZE BUILDINGS FEASIBLE?

Yes. While the market share of ZE buildings is still small, there are numerous examples around the country, built by a variety of design teams and developers, across many different building types. In Amherst we already have the Hitchcock Center, the Kern Center, Crotty Hall, and the South Amherst Congregational Church as non-residential ZE buildings.

WHAT ARE THE BENEFITS OF ZE BUILDINGS?

Apart from reducing carbon emissions, ZE buildings offer superior comfort and healthier places to work and live. ZE buildings are more resilient to the impacts of climate change and are also less vulnerable to the instability of energy prices.

HOW IS A ZE BUILDING CREATED?

1. ZE goal from start of project.
2. Assemble a knowledgeable and passionate design team.
3. Design to reduce the amount of energy a building uses through the most efficient envelope strategies and application of highly energy efficient technologies.
4. Design for the installation of onsite or nearby renewable generation to meet the energy needs of the building, primarily solar photovoltaic panels.

DOES ZERO ENERGY MEAN ALL HEATING FUELS OR ELECTRIC SOURCE ONLY?

Under the language of this bylaw no fossil fuel is allowed except for emergency generators. Both air-source and ground-source heat pumps which use electricity can be used for heat and air conditioning.

The Bylaw does not mandate specific ways to get to zero. Fossil fuels for vehicles are not excluded in the bylaw—though we look forward to seeing the Town add to their fleet of electric vehicles.

HOW DO WE KNOW IF A BUILDING HAS ACHIEVED ZE PERFORMANCE?

Metered data will tell whether the building has met a ZE standard—both energy used by the building and generated by the renewable resources. Because ZE buildings achieve this status over the course of a year, data at full occupancy for 12 consecutive months is required to verify net zero energy use.

WHAT ARE THE ADDITIONAL COSTS TO BUILD FOR ZE PERFORMANCE?

There are examples of commercial and public buildings achieving ZE at little or no additional cost. Several studies have found the incremental cost of ZE buildings to be in the range of 0-15% more than conventional construction costs. This incremental cost is for design and construction only, and does not consider the cost savings of lower energy use to operate the building over time.

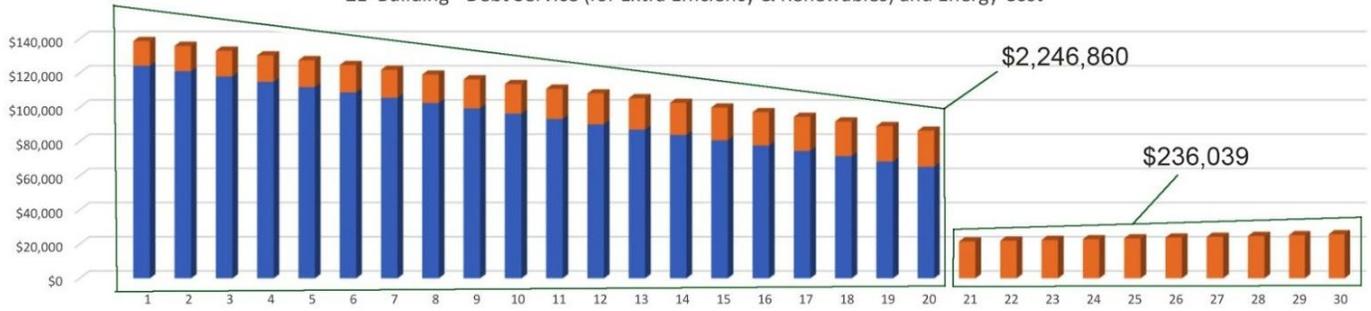
DOES ZE = A ZERO ENERGY UTILITY BILL?

A ZE building means that sometimes a building will draw energy from the grid when renewable generation is low (i.e. the winter) and other times it will return energy to the grid when it generates more than is used. The building is connected to the grid, so there are ongoing charges from the utility for maintenance/transmission beyond the cost of energy, so there would be a small utility bill.

WHAT ABOUT MY TAXES?

It is important to separate the tax increase for potential Town building projects from the tax increase related to this bylaw. The graph below uses a generic \$10 million dollar building that would cost an additional 10% to build to a ZE standard. The blue part of the graphs show the additional debt service and interest on that 10% premium. The orange shows the energy costs for a ZE building and a generic building. The orange bars increase over time with inflation. The figures used in these calculations did not include any state and federal solar incentive or grants and used conservative energy cost increases. **ZE pays for itself and then some when considered over a 30 year period.**

'ZE' Building - Debt Service (for Extra Efficiency & Renewables) and Energy Cost



'Generic' Building - Energy Cost



LEGEND:

- Annual Debt Service for Extra Efficiency & Renewables:
- Annual Energy Cost