



## Advice to President Obama: Grasping the Building Energy Bull by the Horns

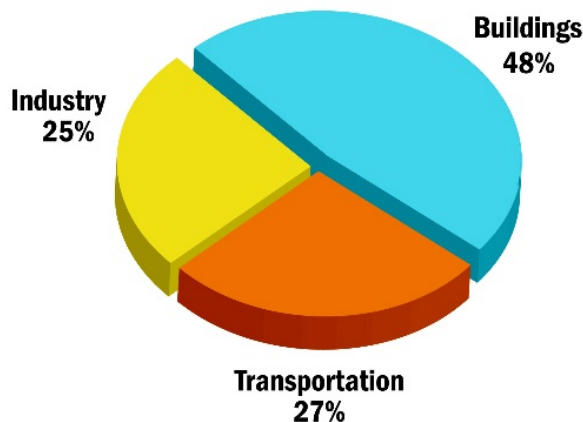
Posted by [Gail the Actuary](#) on January 30, 2009 - 10:44am

Topic: [Policy/Politics](#)

Tags: [architecture 2030](#), [building code](#), [passive house](#), [passive solar](#), [weatherization](#), [will stewart](#) [[list all tags](#)]

*This is a guest post by Will Stewart, who has written [a series of passive solar essays](#) on The Oil Drum recently.*

Mr. President, your inaugural address recognized “*the ways we use energy strengthen our adversaries and threaten our planet*”. You’ve touched on two crucial challenges that America faces; reducing our dependence on energy sources of a foreign or fossil nature, and reducing the damage we cause to our own biosphere through pollution from many of those same power sources. Since the energy crises of the 1970s, we have been slowly sleepwalking back into a culture of excessive overconsumption, backsliding in [our addiction](#) to cheap, non-renewable, polluting energy sources.



### US ENERGY CONSUMPTION

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Data Source: US Energy Information Administration

**Figure 1 - U.S. Energy Consumption by Sector**

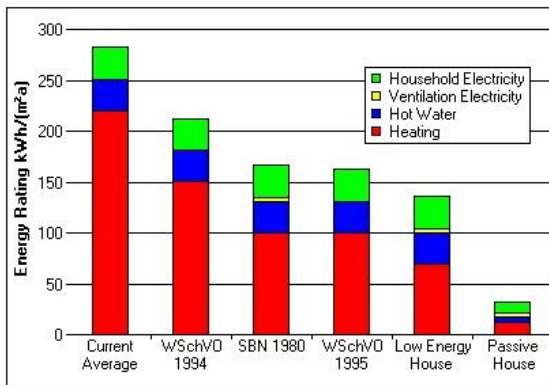
Figure 1 shows that the largest part of our energy consumption resides in the **building sector**, making this an area we *must* place a high priority on improving (and improving drastically). Fortunately, drastic improvements are within our grasp...

Architects know that buildings can be designed to operate with far less energy than today’s average U.S. building at little or no additional cost. -- *The American Institute of Architects*

The 2007 House Energy bill sought the updating of building codes to reduce primary energy use (i.e., heating, cooling, lighting, and ventilation) of new buildings by at least 30% by 2010, and 50% by 2020. While this provision was struck due to procedural blocks by some Senators, it showed movement in the right direction; however, with many significant advancements in building energy efficiency, the levels should be higher and sooner.

**Well-insulated homes that capture the warmth of the sun cost very little extra to build, but provide significant cost savings.**

For example, [DoE's NREL monitored one passive solar house](#) built 16 years ago, finding primary energy costs savings of 56% compared to similar houses built to the Model Energy Code; small tweaks in the design could have realized a total of 70% energy savings. It may surprise some, but this house cost no more to build than other homes in the neighborhood. With regard to commercial and government buildings, an initial upfront investment of up to \$100,000 to incorporate green building features into a \$5 million project would result in a [savings of at least \\$1 million](#) over the life of the building, assumed conservatively to be 20 years.



**Figure 2 - Comparative Energy Savings of a Passive House**



**Figure 3 - Bedzed development in UK uses [88% less heating energy](#)**

Stepping up a level, the [Passive House](#) architectural movement (originating in Germany) has been realizing designs that save 75-90% of a building's primary energy use. [Architecture 2030](#), an independent research organization, understands that strides that can be made in building energy efficiency. In 2006, it initiated the 2030 Challenge, which calls for a 50% reduction in new building energy fossil fuel use by 2010, and net-zero energy use by 2030. The UK is much more aggressive with a [net-zero requirement for all of its new buildings by 2016](#).

**Figure 4 - The UK is already producing [net-zero energy buildings](#)**

**Figure 5 - The [net-zero energy Audubon Center](#) in Los Angeles**

### **Weatherization of older homes helps to improve energy efficiency and reduce energy use.**

Existing homes must also be addressed. The current weatherization program creates 52 direct jobs and 23 indirect jobs for each \$1 million invested in weatherization work. For every \$1 invested by DOE, the program leverages \$1.53 in other federal, state, utility, and private resources.

Current energy requirements for replacement HVAC systems are also improving far too slowly. For example, the current minimum energy requirement for heat pumps is SEER 13; my 11 year old heat pump is SEER 16, so clearly we can do much better. And gas furnaces achieving 92% efficiency have been on the market for decades, though the current minimum is only 83%.

So while the challenges are real, the change to sustainable solutions now only requires us to take action.

- **Challenge:** [New buildings](#) continue to be built, even in this economic environment, though they are using model energy codes that are only marginal improvements over the state of current energy efficiency practices. Much larger strides should be made, as evidenced by Architecture 2030 and Passive House.
  - **Recommendations:**
    - Forge new model energy codes for residential/commercial/industrial buildings that stipulate primary energy reductions of;
      - 50% by 2012,
      - 75% by 2016,
      - net-zero energy by 2020
    - Institute inspection procedures (commissioning with projected energy use) ensuring that new buildings meet these minimum requirements before they can be sold or occupied.
    - Tax larger new homes in a manner similar to [gas-guzzling cars](#), and provide tax incentives for compact new residences, similar to the [plug-in hybrid electric vehicle credit](#).
      - New residences exceeding 30 million BTUs/year projected primary energy use are taxed incrementally; those less than 5 million BTUs/year receive

tax credit

- Have new building developments attain a minimum of [LEED for Neighborhood Development \(Gold\)](#)
  - Accelerate appliance energy efficiency improvements, including a near term ['smart' appliance and thermostat standard](#)
- **Challenge:** Existing buildings, especially older ones, use much more energy per square foot than new buildings. Most have inadequate insulation and draft protection; existing weatherization programs have been shown to produce significant cost savings ([which are underestimated](#)).
    - **Recommendations:**
      - Accelerate the weatherization program you propose from 1 million homes per year to 3 million homes per year by starting an "Energy Corps".
      - Require commercial and industrial building renovations to meet 75% of the new building improvement requirements by the timeframes (see above)
      - Require residential building air-to-air heat pump replacements systems to achieve a minimum of;
        - HSPF 8.5 and SEER 16 by 2011
        - HSPF 9.0 and SEER 18 by 2013
      - Require gas furnaces to achieve a minimum of 92% AFUE efficiency by 2011

Americans are eager for change from buildings that needlessly waste energy to those that provide greater energy security and less climate impact. Indeed, some of us are already [walking the walk](#). The practical means and technology to significantly lower the energy requirements of our building sector is in our hands. As you said, "Our scientists, businesses and workers have the capacity to move us forward." All that is required for widescale energy and emissions reduction is for leadership to seize the moment.



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