Let's Do For Buildings What We Have Done For Cars

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Canadian Version

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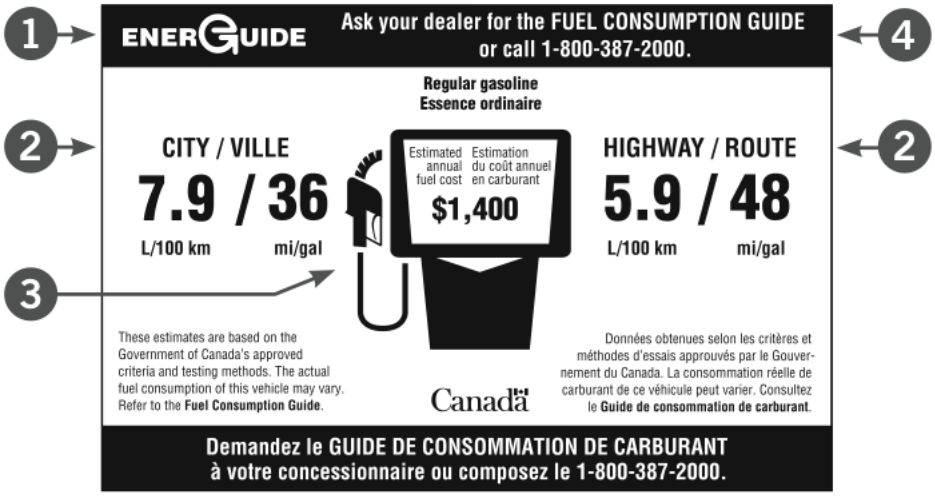
WE HAVE A LOT TO LEARN FROM THE AUTOMOBILE INDUSTRY

→ Drive down the street to any car dealer's lot and every car you see will have a sticker that tells you it's fuel consumption and how it relates to its peers (Figure 1). This is not just information for when you are buying a new vehicle. It indicates a government requirement – manufacturers have to meet mandatory fuel consumption targets measured as average miles per gallon (mpg) across the fleet of cars they sell.

FIGURE 1

EnerGuide Label



The sticker is not only a very visible indicator of individual vehicle fuel economy, but is also an effective policy mechanism for controlling the overall fuel consumption of all cars, and hence their carbon emissions. By simply raising the fleet averages year on year, the US Government was able to double new car fuel efficiency over the decade from 1975-85 in response to the oil crisis. In May 2009, President Obama raised the average for cars and light trucks again, this time from 25 to 35mpg between 2012 and 2016. This is projected to save 900 million metric tons of carbon over the four years – the equivalent of shutting down 194 coal-fired power generators.

Why don't we do the same for buildings? If our goal is to make a serious dent in global greenhouse gas emissions, we would do well to take a few lessons from the car industry and apply them to our buildings. To put the issue in context, buildings account for around 40 percent of total carbon emissions in North America, while SUVs account for just 3 percent. Imagine the impact if we could put an efficiency sticker on buildings and halve their emissions over 10 years. Halving building emissions would save 1.14 billion tons of carbon in the US in one year alone.

Zerofootprint is currently in the process of rolling out just such a sticker program to many hundreds of buildings on a voluntary basis (Figure 2), based on its VELOmetrics™ benchmarking software and environmental footprinting engine.

FIGURE 2

HISTORY

→ The US Congress introduced the Corporate Average Fuel Economy (CAFE) regulations in response to the oil crisis of 1973-74 with the aim of driving up the fuel efficiency of cars and light trucks. The Environmental Protection Agency (EPA) calculates the average fuel economy for each manufacturer's fleet of vehicles, and the standards are administered by the National Highway Traffic Safety Administration. Despite criticisms that the EPA methodology underestimates miles per gallon under real driving conditions, and some horse trading that led to SUVs being classified as light trucks rather than domestic vehicles, the CAFE regulations have proved an extremely effective policy tool. They enable government to simply set the benchmark – the fleet average miles per gallon – and leave it up to the manufacturers' engineering and economic ingenuity to achieve them. Other countries have since adopted CAFE-like regulations, often with much higher benchmarks – 51 mpg by 2012 in Europe and 48 mpg by 2010 in Japan.

By comparison, we know very little about the energy efficiency of our buildings, and there is no overall benchmark for their performance. The owners or tenants know something because they pay the utility bills, but there is nothing that tells the passer-by about the comparative efficiency of a building in the same way as a miles per gallon sticker does for cars. And there is nothing that tells a city or government authority what the 'fleet average' performance of its buildings is. And because we don't know the average performance of our buildings, there isn't the same policy lever that we can pull to reduce their carbon emissions as we can do with cars.

GIVE BUILDINGS A STICKER

→ We can change this. We have the tools to measure and calculate not only carbon emissions, but the wider ecological footprint, including water usage and total energy usage. We can introduce a program to measure every building's performance (or every building over a given size in the first instance to make it more manageable) and give it an efficiency sticker. Once a city has measured all its buildings it can calculate their average – in this case, in terms of footprint per square meter of floor space.

Let's say that, in terms of carbon, the city ends up with a figure of 50 kilograms of carbon per square meter on average. Now the government could mandate that all cities in its jurisdiction must achieve a target of 40kg of carbon per square meter within five years – a 20 percent reduction. It could do the same with water and total energy, to get an overall footprint reduction.

One of the main advantages of this approach is that it leaves it down to the local experts – the city authority and its specialists – as to how they go about achieving this, and where they focus their efforts for maximum effectiveness. The city authority will know what its building stock mix is, just as a car manufacturer knows its mix of vehicle types and focuses on those where it can get the most cost-effective payback.

LOCAL INGENUITY

→ The city will know that it has, for example, a lot of banks and high tech companies whose activities are electricity intensive, and several pharmaceutical laboratories that use a lot of water. The individual building stickers will enable it to compare like with like, to identify those banks that are least energy efficient compared with their peers, or which pharmaceutical companies use the most water. The city can insist that these poor performers improve.

The city will also be able to identify which groups of buildings perform worst, and direct its energies towards them. For example, it might have a number of estates of 1960s high-rise apartment blocks built of concrete, poorly insulated, and which are hopelessly inefficient energy-wise. The city could decide to 'reskin' them – clad them in an insulating layer and retrofit other energy efficiency measures – which would bring big gains.

With new buildings, the city can simply mandate high levels of efficiency. If it has a stock of old buildings that are particularly difficult to improve, it might set the bar for new buildings even higher in order to compensate.

The point is the national government doesn't need to know anything about the particulars of a city's buildings, nor does it need to set specific targets for specific building types. All it needs to do is set the overall benchmark – the average footprint (comprising carbon, water and total energy) – and leave it to the individual cities to use their knowledge of their building stock, and their skills and ingenuity to meet the target.

CHANGING BEHAVIOUR

→ Putting footprint stickers on buildings could also bring about significant voluntary change. If you went into town to your bank and saw that its sticker showed that its carbon rating was twice that of the bank next door, you could demand to know why and what the bank was doing to improve. Building owners would want to do at least as well as their peers. This would work particularly well for residential housing.

The same footprint sticker and benchmark average methodology could be applied to residential buildings. If every house had a sticker on the front, you would be able to compare the carbon ratings and energy performance when you were deciding on buying a new home. Neighbours would also be able to see how they performed compared with each other. Studies have shown how this peer comparison is a very powerful mechanism for changing behaviour.

CONCLUSION

→ We are already some steps down this road. President Obama has set a goal of making all US buildings carbon neutral or zero emissions by 2030. Britain and other countries now require houses to be energy rated when they are put up for sale. Building footprint stickers and city building stock averages would create a powerful policy tool to drive down emissions from buildings and make substantial global carbon savings.

At Zerofootprint we are seeking many thousands of buildings to join our benchmarking exercise, and are lobbying to have governments develop policies for buildings such as the fuel policy described in this article. For further information please contact Kelly.Hagen@zerofootprint.net.

ENDNOTE

→ The introduction of the CAFE regulations sparked not only dramatic fuel efficiency improvements, but a revolution in the overall technological performance of cars. Cars not only use less fuel, they pollute far less and they are far smarter than they were in 1975. The Honda Civic, for example, is 100 times less polluting now than it was 30 years ago. How has this been achieved? One of the main reasons is that the Honda Civic, like most cars today, is full of sensors, microprocessors and mathematical algorithms which govern and optimise its operation, from its fuel mix to its braking. It also reports back everything to you via its dashboard – speed, revs per minute, current fuel consumption, average fuel consumption, etc. And it warns you of potential problems, such as fuel or oil running low or the engine overheating.

This is another leaf we could take from the car makers' book, and install sensors, microprocessors, optimization software and dashboard monitoring in all our buildings. We have all these tools. We just need to use them, and then maybe we can get a 100 times improvement in the operating efficiency of our buildings too.