# Haifa's smart green building

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With the planet firmly in the grip of undeniable climate change, technology gurus have embraced a solution.



Photo by: AVI KATZ

What in the world is a smart green building? To find out, I recently toured Intel's new ID 9 building opposite Haifa's Science Park. The building's deceptively innocuous name does not do justice to the advanced technology – and engineers who create that technology – it houses.

ID9 uses advanced design, software and hardware to conserve energy, water and other resources. The sweltering record-breaking heat recorded in July and August – the hottest in Israel's history – illustrates how much we need to find ways to cut greenhouse gases and slow global warming.

A great deal of attention is focused on $CO_2$ emissions of cars. A new American standard announced by the White House calls for doubling fuel efficiency to 54.5 miles per gallon by 2025. But worldwide it is homes and other buildings that cause fully 40 percent of global carbon emissions – a greater amount than cars – with half of that from commercial buildings. And there are a wide variety of ways that exist today, and not in a distant 2025, to slash energy consumption in buildings.

ID9 is Israel's first "gold" building certified by LEED (Leadership in Energy & Environmental Design), a system developed by the US Green Building Council to rate environmentally friendly buildings. Only the new Porter School of Environmental Studies building, at Tel Aviv University, will rate higher with its "platinum" status, when it is completed in 2014. And that building will also be used as a teaching resource (for if not there, then where?).

The LEED system allocates points for sustainable sites (ID9 is near a train station, and built on a former parking lot), water efficiency, energy and low carbon emissions, materials and

resources, and indoor environment quality. For instance, you get points for providing a bike rack and a shower.

Intel is a fiercely bottom-line company. So the first thing I ask my host, Tamir Zeliger, an Intel engineer who runs operations at the ID9 facility, is whether investing in smart green buildings really pays. He says the overall payback period (the time needed for resulting savings to equal the initial investment) is seven years. This is far from the target payback of 3-5 years Intel usually seeks.

But there are intangible benefits, he notes.

"Intel wants to position itself as an industry leader in sustainability, and ID9 brings a lot of positive PR and adds to the sense of pride of its employees," Zeliger says. ID9, he notes, is Intel 's first LEED "gold" building worldwide.

Some of the "green" features at ID9 are not much different from what I do at home, such as using the water draining from our air conditioner to help nurture our garden. ID9 collects condensation water and then reuses it in cooling towers, saving 2,000 cubic meters a year. Then, the waste water from the cooling towers is reused again for toilets and irrigation, saving another 2,500 cubic meters annually.

What about lighting? Some of us green supporters go around turning off lights, at home and at work. Zeliger's ID9 team has a better way. He shows me the EWC (Environment Web Control) system his team invented, which saves about $100,000 yearly in electricity. ID9 has open work spaces and each worker's cubicle is the same size, including that of the director.

Each worker controls individual lighting through a website, and can adjust air temperature from their computer. Lights go off automatically when no one is there, unless workers turn them on again. ID 9 has a DALI (Digital Addressable Lighting Interface) that controls each light individually.

"We are now trying to export EWC to all Intel sites," Zeliger tells me.

Like many high-tech companies, Intel's servers gulp electricity like gluttons. Most servers operate at half capacity, at most; ID9's servers run at 85 percent. Sophisticated software helps the servers schedule jobs more efficiently, when engineers overestimate the required time. This saves a lot of electricity. (Once, when I visited Google headquarters in Mountain View, California, I was told by a VP that Google seeks old aluminum plants as sites for its server farms. Why? Because aluminum production demands huge amounts of electricity, as do Google servers.) Do Intel workers like working in ID9? I ask. Ultimately, if buildings are not appealing to their users, it won't help if they are smart and green or not.

"Yes," Zeliger says. "It's modern, full of natural light, has a state-of-the-art gym, and dairy cafeteria overlooking the Mediterranean."

Indeed, the all-glass northfacing wall has a spectacular view of the Mediterranean and floods the building with sunlight.

According to British researchers Stephen Drewer and David Gann, "the concept of smart or intelligent buildings was initiated in the USA in the early 1980s and it has been advanced there probably more than anywhere else." But then, they note, "the lead passed from the USA to Japan and Western Europe".

New buildings can be built smart and green. But, can you teach old existing buildings to do the same? If not, since buildings stand for many decades, it would take a very long time to upgrade them. Retrofitting is indeed possible; in New York City, the 80-year-old Empire State Building, once the world's tallest building, has been retrofitted, at a cost of $550 m., to become smart and green, with a "gold" rating. Energy consumption will fall by 38 percent.

But nonetheless, does retrofitting pay? Israel has recently implemented Standards 5281, 5282 and 1738, voluntary standards for new buildings with reduced environmental impact. But as Prof. Evyatar Erell of Ben- Gurion University of the Negev noted in a Technion- Neaman Institute report, "if we only focus on standards for new buildings, it will take a very long time to achieve results.

Clearly, we need to deal with existing buildings."

In her MA thesis at Tel Aviv University, Hadas Gabay did a cost-benefit analysis to determine whether it pays to erect buildings that are smart and green, both from the builders' perspective and that of society as a whole. For contractors, she found, the extra costs of complying with the standards are recovered within three or four years. Why, then, do we not see more smart green buildings? Yet this is not the first time profit-driven builders have failed to embrace modern technology. "Building entrepreneurs who fail to understand the nature of green building," Gabay notes, "are concerned with the additional costs it incurs, without realizing its benefits and economic potential." Perhaps if newly aware home buyers and businesses demand green buildings, more of them would be built.

Israel's energy economy is in bad shape.

During this sizzling summer, there was a danger of brownouts, as the capacity to produce electricity was dangerously close to equaling peak demand. In the first half of 2012, electricity consumption rose by 10 percent, three times faster than Gross Domestic Product. According to the European Renewable Energy Council, Israel's goal to produce 10 percent of its electricity from renewable sources (wind, solar, etc.) by the year 2020 is far below that of Sweden (50 percent), France (23 percent) and even Greece (18 percent).

Meanwhile , the Israel Electric Corporation (IEC) is in deep trouble. It owes NIS 20.6 billion ($5.1 billion), which will be due immediately if its financial situation worsens.

I suspect that the tycoons developing offshore gas, to be sold to IEC for electricity generation, are joining with IEC to stall renewable energy legislation.

I asked Haifa U. Prof. Ofira Ayalon, my Neaman Institute colleague and an expert on environmental policy, what Israel is doing to reduce greenhouse gases. She says that the official plan, budgeted at some NIS 2 billion, puts as much as NIS 1.4 billion into "efficient appliances" – giving consumers money to help buy more energy-efficient refrigerators and air-conditioners. But, she notes, if these appliances operate in inefficient buildings, the effect is greatly reduced. Air-conditioners simply have to work harder when cool air is lost, for instance. Smart green buildings mitigate greenhouse gases, but they also adapt to global warming, helping us remain comfortable in the face of rising temperatures.

Personally, I found this summer unbearably hot, as did many of my friends and neighbors, even though the average temperature was less than two degrees above average.

When I looked at a global temperature map, parts of the northern hemisphere were colored red, meaning recent average temperatures were from 4-7 degrees above average.

There is a reason the Arctic ice and glaciers are fast disappearing.

Are there still people out there who doubt climate change is real? Indeed, there are. And perhaps even though some of us are neither smart nor green, we can still create new buildings that are, and even retrofit old buildings as well. If not, our children and grandchildren will face weather that is barely endurable.