

90 BY 50

Coverage Highlights



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Slate

The Triple-Pane Windows Theory

A shockingly simple blueprint for big cities to save the planet without wrecking the economy.

By **Will Oremus** | Wednesday, Feb. 13, 2013, at 4:06 PM



People gather in Lower Manhattan on October 2012 in New York City.
Photo by Mario Tama/Getty Images

Climate scientists have estimated that, in order to avoid runaway global warming, the world would need to cut its carbon emissions roughly in half by 2050. Since emissions in developing countries like China and India are still rising fast, meeting this target would require developed nations to aim for a figure more like 80 percent. When you consider that the United States, the largest polluter in the developed world, has no real strategy in place to achieve that—and that no binding international agreements appear to be on the horizon—the goal can start to sound nigh impossible.

The task is so intimidating that even serious people are starting to entertain extreme-sounding geoengineering ideas like flying business jets into the stratosphere and spraying sulfuric acid all over the place to try to deflect sunlight before it reaches the Earth. Others reckon it's already too late to prevent catastrophic warming—we'll have to build sea walls and hope for the best. President Obama alluded to a possible cap-and-trade system in Tuesday's State of the Union address, but few believe such a sweeping policy would pass Congress.

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Yet in a report that will be released on Thursday, the nonprofit Urban Green Council makes the case that the country's largest population centers needn't rely on a federal breakthrough. Specifically, the 51-page report, titled "90 by 50," finds that New York City could slash its emissions by a whopping 90 percent by 2050 without any radical new technologies, without cutting back on creature comforts, and maybe even without breaking its budget.

That's a far more aggressive target than even the city's own relatively ambitious goal of reducing emissions by 30 percent by 2030. How is it possible? The strategy has plenty of familiar components—electrifying the transit system, converting to renewable power sources. But it all hinges on one seemingly mundane yet surprisingly potent move: retrofitting almost every building in the city to keep the heat in during the winter and out during the summer. In a nod to Rudy Giuliani, Bill Bratton, and James Q. Wilson, I'll call it the "triple-pane windows theory" of greenhouse-gas reduction.

The report takes as its starting point this foundational statistic: 75 percent of the readily measured carbon emissions in New York City come from buildings. That makes it very different from the nation as a whole, where agriculture and transportation are among the biggest culprits. At first glance, this looks like an obstacle: Inefficient buildings are much harder to replace than inefficient cars. And New York is already

one of the country's greenest cities per capita, which would seem to make a 90 percent cut more difficult than it would be elsewhere.

But the council's report suggests the opposite: that a dense metropolis like New York is well-suited to lead the way on emissions reductions. The key, says the Urban Green Council's executive director, Russell Unger, is that the city must begin to view buildings as infrastructure, like roads and sewers, rather than simply as private property. "It will require a mind shift for the public and the government," Unger says. "But you know, most of these buildings will last longer than the Tappan Zee Bridge." And they gobble carbon-fueled energy like crazy.

To get those emissions under control will require three main steps, all difficult but none inconceivable. The first is probably the most ambitious and innovative: gradually retiring the city's massive, aging steam heat system and replacing it with high-efficiency electric heat pumps. Low-

rise residential buildings would get individual mini-split pumps, a relatively easy fix, while high-rises would need to convert from steam to central geothermal heat pump systems. That's an expensive proposition, but it would also save staggering amounts of energy over time, with cost savings that would help offset the capital outlay. And the retrofits wouldn't happen all at once—they'd be done as each building comes in for renovations that it would need anyway.

Heating the city's buildings and water electrically would make it far easier to draw that energy from renewable sources. (The alternative is to run the steam system off biomass, but it's not clear how feasible that would be.) The Urban Green Council's report doesn't prescribe exactly how New York should do that,

90 BY 50 - BUILDING TECHNOLOGIES



FIGURE 1.1.1.1. SOME OF THE ENERGY EFFICIENCY MEASURES USED IN THE 2010 BUILDING MODEL

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but it's a standard part of any serious carbon-cutting plan. Today the city gets about one-third of its electricity from natural gas and one-tenth from coal. The more it can replace those with nuclear, hydroelectric, wind, or solar power, the deeper the emissions cuts will be. Solar panels on every roof might be a nice supplement.

It's the third step, though, that may make the above possible: energy conservation. Here, the report isn't asking residents to cut back—it refers to stripping waste and leakage to the bare minimum. Tweaks that seem small—insulation, plugging air leaks, heat-recovery ventilation, fluorescent lighting—loom big. New buildings in the city already include some of those measures. But the Urban Green Council's plans would carry these standards to unprecedented levels—not just double-glazed windows, but *triple*-glazed windows—and apply them to existing buildings as well whenever they're updated. That's an awful lot of work, but the potential payoff is bigger than you might expect. Think of how much a heater has to run just to keep a room at a constant 70 degrees on a 35-degree day—and then imagine instead that the room is so thoroughly sealed that it can stay near 70 for much of the day on its own.

It's in service of this goal that the report makes one of the few suggestions that might raise New Yorkers' hackles from a quality-of-life perspective: capping the percentage of see-through glass on high-rise buildings at 50 percent. That means that some would lose their perfect, unobstructed views. That's in conflict with the city's current development trends, says Dick Leigh, the Urban Green Council's director of research. "People want buildings with huge expanses of glass. But no matter how good the glass is, it's not going to be as good as an insulated wall."

Why do insulation and air flow matter so much? Because without it, the city's big transition from steam to heat pumps would drastically increase the load on the electrical grid, bringing huge additional costs. With it, the Urban Green Council believes the switchover could be accomplished with only a modest impact on total electricity consumption.

Even with all those changes to its buildings, the city would still need serious cuts in its emissions from transportation and waste to reach the grail of 90 percent by 2050. It's not an easy number, no matter how it's sliced. But Leigh notes that the transportation sector, which accounts for 21 percent of the city's emissions today, may not be as hard a nut in New York City as it is elsewhere in the country. The city is already built for people without cars—fewer than half of New York households have one. That means that some relatively reasonable expansions and electrification projects could go a long way. Converting city buses to electric trolleys, as San Francisco has done, would also help.

All told, the council estimates that the measures in its report could get the city to the 90 percent target by 2050 at a cost on the order of \$167 billion in 2012 dollars. That works out to about \$5 billion per year, or about 0.4 percent of its gross municipal product. It sounds prohibitive, but the report also anticipates savings of \$148 billion, which would reduce the net price tag to something more like \$20 billion. The cleanup from Hurricane Sandy, meanwhile, is estimated to cost \$50 billion.

It's hard to believe these numbers are accurate. The cost of big infrastructure changes almost always soars far beyond projections. The report itself acknowledges that "there is something quixotic about estimating costs for a project that extends at least 37 years into the future." Nor is it a sure thing that a 90 percent reduction in emissions would result even if all the recommendations are implemented.

But Unger, the council's executive director, emphasizes that the report is not meant to be a precise blueprint. It doesn't take into account political obstacles and makes no effort to identify specific policy options or funding sources. Instead, he says:

What we were trying to do here is address the almost despair that you see now among people who are concerned about global climate change. There's been so much emphasis on legislation nationally and on international agreements. As those have fallen through, I think the worry has been, "Is there an alternative?" So what we wanted to study was, taking the goals we've heard, is this even doable? From a technical perspective, the answer we got was "yes."

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No doubt the “90 by 2050” mark is a long shot for New York, let alone the country as a whole. Yet at a time when big policy ideas like a carbon tax seem out of reach, the report makes a convincing case that it’s worth aiming high anyway, starting in the biggest cities, with technologies that are already available. In a rapidly urbanizing world, what works in New York might work a lot of other places, too. And if the worst-case scenario for tackling climate change is spending billions of dollars, missing the emissions target, and having a slightly less dazzling view from the top of the city’s luxury condos, well, that seems a lot more tolerable than the worst-case scenario for not tackling climate change.

Correction, Feb. 14, 2013: *A home page headline for this article originally summarized the report as a way for New York to cut "energy use" by 90 percent.*

The New York Times

City Room



ENVIRONMENT February 14, 2013, 7:01 pm

Environmental Group Targets Spewing Buildings in Pollution Report

By [MARC SANTORA](#)

When people consider the prime sources of carbon gas emissions in New York City, cars, trucks and buses belching smoke are often the first culprits to come to mind.

In fact, homes and offices spew far more carbon into the atmosphere than all motor vehicles in the city combined. Some 75 percent of all carbon emissions in the city come from the buildings.

Using that sometimes surprising fact as a starting point, the nonprofit [Urban Green Council](#) has outlined a series of measures that it says could result in the city's reducing carbon emissions by 90 percent by 2050 – a far more ambitious figure than the [city's current goal](#) [pdf] of 30 percent by 2030.

Perhaps most striking about the report, “[90 by 50](#)” [pdf], released on Thursday, is that it does not assume any fancy



Steam billowed from a power plant in Astoria, Queens, in October. Energy use by buildings accounts for 75 percent of the city's greenhouse gas emissions.

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new technology or major change in how people live.

Instead, it relies on a strategy that many people have been reminded of by a grandparent at one point or another: keep the heat in during the winter and out during the summer.

In an [article in Slate](#) – and a nod to the “broken windows” crime-fighting approach made famous during the Giuliani administration – the proposal was called “the triple-pane windows theory.”

The council’s report calls for buildings to be viewed not as objects trapped in the amber of outdated heating and cooling technology, but more as infrastructure similar to roads and sewers.

The report outlines several steps to make buildings more efficient and outlines different approaches for eight different building types most common in the city – from low-slung brownstones to towering skyscrapers.

First, it envisions ridding the city of its increasingly aging system of heating many buildings with steam-generated power and ending all dependence on coal. Instead, buildings would be connected to the grid with high-efficiency electrical pumps.

Beyond the major infrastructure changes, the report says that a series of seemingly small changes could have a striking impact. It calls for better insulation, heat recovery ventilation and plugging of air leaks, among other actions. It also proposes using triple-glazed windows.

The report estimates that such an effort would require a capital outlay of \$94 billion over 35 years. But it also estimates that the savings from increased energy efficiency would be \$87 billion over that time.

Of course, the impact would go far beyond the financial. The ultimate goal is to combat climate change, which Mayor Michael R. Bloomberg has recommitted himself to battling in the wake of Hurricane Sandy.

“Our climate is changing,” Mr. Bloomberg h. “And while the increase in extreme weather we have experienced in New York City and around the world may or may not be the result of it, the risk that it might be – given this week’s devastation – should compel all elected leaders to take immediate action.”

The city is already a global leader in reducing greenhouse gases, the report notes.

“But it is not enough,” the report states. “To ensure a global environment in which human society can bring security and prosperity to all its members, climate science tells us we must reduce carbon pollution dramatically. A figure of 80 percent globally by 2050 is often cited. A reduction of 90 percent in the readily measured fraction of the city’s emissions will be necessary to meet this goal, and this study outlines an energy economy for New York City in 2050 that will match this challenge.”



New York City has a plan to cut carbon emissions by 90 percent

February 14, 2013

(Based off of Slate's article)

New York could slash its carbon emissions by 90 percent by 2050 with an aggressive program of energy efficiency upgrades that wouldn't break the bank.

Slate.com provided a review of the Urban Green of the [Urban Green Council's report "90 by 50"](#) that finds New York and other large population centers could cut their carbon emissions significantly without major building programs or even changes of habit by the population.

New York City already has its own plan of reducing emissions by 30 percent by 2020. The plan includes the basic like converting mass transit from diesel trains and busses to electricity and converting to renewable power sources. But 75 percent of the city's carbon emissions come from buildings.

But biggest gains could come from retrofitting nearly every building in the city to provide better insulation. That way it takes much less energy to heat and cool massive buildings.

The report lays out three steps that would make it possible:

1. Replace the city's steam heat system with a geothermal system for high-rise buildings. Residential buildings would get mini-split electric heat pumps.
2. Use renewable energy to heat the city's buildings and water, including nuclear, hydroelectric, wind or solar power.
3. Encourage energy conservation with retrofits for insulation, air sealing, heat-recovery ventilation and efficiency lighting.

The report estimates that the city could get to the 90 percent target by 2050 at a cost on the order of \$167 billion in 2012 dollars. That works out to about \$5 billion per year, or about 0.4 percent of its gross municipal product.

Slate.com wrote the report anticipates savings of \$148 billion, which would reduce the net price tag to something more like \$20 billion. The cleanup from Hurricane Sandy, by comparison, is estimated to cost \$50 billion.

For more information, see our [Sustainable Communities Research Center](#).

[Via [Slate.com](#)] Photo via Flickr/[Kyle McCluer](#)

FAST COMPANY



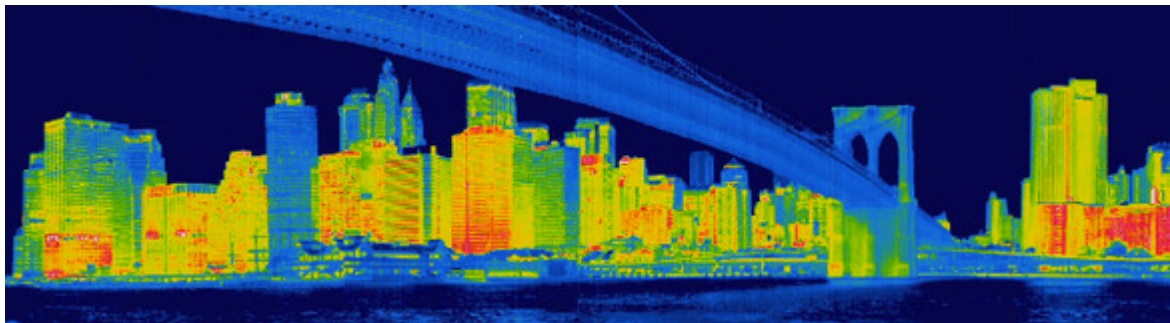
The 7 Steps New York Can Take To Reduce Its Carbon Footprint 90% By 2050

It's not about removing cars or finding new crazy sources of power. It's just some simple construction work.

March 7, 2013
By Zak Stone

The greatest barrier to making real progress on climate change may not be the oil lobby, overconsumption, or a lack of technology: it's the widespread dread that nothing can be done.

That's the message of "90 By 50" a recently released report from the New York City-based Urban Green Council that examines how its hometown could reduce its carbon footprint by 90% (!) between today and 2050 using widely available technologies.



While New York City is already working toward a goal to reduce emissions 30% by 2030, Urban Green Council calls those initiatives "noble and largely successful" but essentially, underachieving. Climate scientists agree that we need to reduce emissions 80% by 2050 to keep climate change from permanently spiraling out control.

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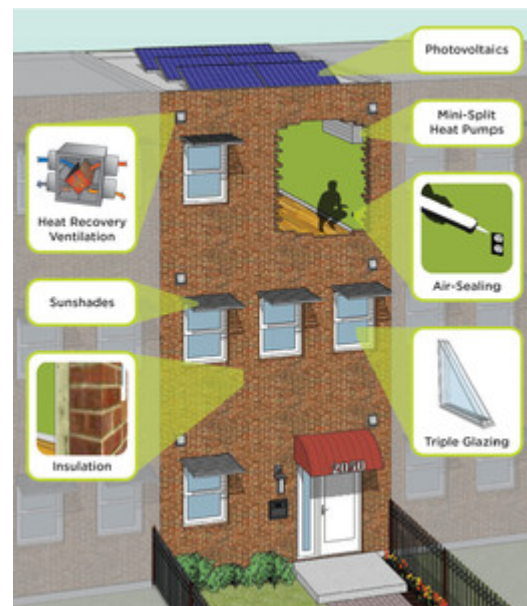
Building and tinkering with a virtual model of New York City, the researchers behind the report found that it's not getting cars off the road or putting stricter restrictions on factories that will likely get the most savings in New York. What New York needs to do is make the city's buildings--which account for 75% of greenhouse gas emissions--more energy efficient.

Russell Unger and Richard Leigh, Urban Green Council's executive director and research director, respectively, walked me through some of the suggestions in the reports, which focuses on the often less-than-sexy, practical ways that building owners could reduce carbon emissions, starting today.

1. MAKE IT TIGHT

New York City's older buildings are like a leaky sink for air. In the winter, cold air blows in through the front door, sweeps through the hallways, and drives warmth out of the apartments. Leigh says the very first thing that every building owner should do to lower its demand for energy is to make the building airtight (similar to the strategy of the "passive houses" I've written about before.)

This includes caulking electrical outlets, tightening up loose windows, adding weather stripping to the front doors, and sealing elevator houses on the roofs. Unger says this is actually "one of the toughest things to get right--not as a code issue but a practice issue" since it involves paying much more attention to airflow, which property managers and handymen aren't used to.



2. KEEP IT FRESH

"If you have been very successful with your air sealing [...] then you may have made the building so tight that you don't have enough fresh air," says Unger. Step 2 is a remedy to that--by installing an artificial ventilation system for heat recovery. This will simultaneously push out stale, warm air from the building and use the warm air to slightly heat the cold but fresh air that enters from outside.

Sure, there are modest energy savings, but this step is mostly about preserving a healthy indoor environment, free of moisture, mold, and carbon monoxide.

3. GLAZE IT THRICE

Triple-glazed windows with wood or fiberglass frames may cost more, but "the modest extra cost will get paid back in fuel savings," says Leigh. The report suggest that every window, when its time has come, should be replaced with the best quality window possible. The modest extra cost will get paid back in fuel savings.

4. INSULATE

Unger and Leigh admit that adding insulation can be one of the trickier recommendations on the list since it's more of a construction project. Low-hanging fruit include spots under the rafters or under the roof, where insulation can be easily tucked away. They also suggest using weatherproofed foam insulation on top of a roof membrane or even on "ugly walls on the backside of your building" says Leigh.

Insulation is currently improving all the time. Recently developed (and, for now, more expensive) types can be as effective with one inch of thickness as seven inches of what you'll currently find at Home Depot. Who knows what we'll have available by 2050.

5. THROW SOME SHADE

Sunshades above windows help keep out the sun in the summer, which means less need for AC. The energy savings won't be quite as significant as the other steps mentioned here, but will certainly make a difference (especially if implemented across the whole city). While steps 1 through 5 would significantly decrease the overall demand for energy of the city's building stock, steps 6 and 7 would transition buildings away from oil and gas for heat, toward electricity (which, in the future, will come from more renewable sources) and solar power.

6. PUMP IT UP

Mini-split heat pumps--which can heat or cool a building year round with electricity as the only energy source--are tremendously popular in Japan, but have only been available in the States for the past decade or so.

They work similar to an air-conditioning unit--pushing the hot air out of the building in the summer (but then doing the same for the cold air in the winter)--and would replace the city's old-fashioned steam system.

Of course, installing one of these means using way more electricity. The report anticipates that the city's power supply will increasingly move toward renewables and away from coal over the next four decades. And it also assumes that the pump is operating in a house where steps 1 through 5 have been accomplished (which results in a greatly decreased demand for energy.)

7. LET THE SUN SHINE (ON SOLAR PANELS)

It may come as a surprise to see rooftop solar panels as the last step on this list--renewables are often optimistically framed as such a crucial answer to climate change--but Unger and Leigh included them as a coda: Once the other steps are taken to reduce demand for energy, buildings should attempt to create their own energy by adding solar panels.

Unger and Leigh explain that the suggestions are not meant to serve as a specific policy program; instead, they've been crafted in a political vacuum to show that there is, at least, a

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way to do something about climate change (and the full report gets into other carbon savings to be had from the waste and transit sectors).

"One of our hopes for the study is that we've helped paint a sense of what we want to get towards," says Unger.



How New York City Could Cut Its Emissions By 90 Percent

February 15, 2013

The world's political leaders have largely agreed at this point that there needs to be some action on climate change, but most of these resolutions offer vague commitments to preventing any further increase in carbon emissions. New York City on the other hand, has already committed to cutting its emissions by 30 percent by 2030.

Setting a higher bar

However, sustainability advocate Urban Green Council thinks that this goal does not go [anywhere near far enough](#).

"To ensure a global environment in which human society can bring security and prosperity to all its members, we must dramatically reduce carbon pollution by 2050," the group said in a statement. "To meet this goal, a reduction of 90 percent in the readily measured fraction of New York City's emissions is appropriate."

Appropriate or not, most policymakers would look at a 90 percent emissions reduction goal and dismiss it out of hand as unrealistic and, in all likelihood, immensely expensive as well.

Urban Green Council takes issue with both sentiments, suggesting that a variety of existing technologies could readily be implemented over the course of several decades at a relatively modest cost, particularly given potential savings in terms of reduced energy demand.

Moving past the boiler

Slate's Will Oremus explains that the heart of the proposal is a shift away from the [inefficient steam-based heating](#) systems that keep New York City warm throughout the cold Northeast winters now.

Most of these heating systems rely on fossil fuels - primarily natural gas, along with some older furnaces that burn oil - so a shift to electric heat pumps would immediately benefit from the power the city draws from sources like nuclear power, and would also help take better advantage of renewables like solar and wind.

Looking at it from a national perspective, it might seem like an unusual focus, but buildings in New York are responsible for a full 75 percent of the city's carbon emissions, largely thanks to heating and cooling.

And the potential to improve heating efficiency in the city is dramatic, with engineering resources like triple-glazed windows, improved insulation and other types of waste providing easy targets for major improvements.

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Urban Green Council executive director Russell Unger suggests that the process will require people and officials in the city to start treating buildings a bit less like islands and a bit more like infrastructure, but in many ways that is already a reality.

"Most of these buildings will last longer than the Tappan Zee Bridge," said Unger.

The hope is that a variety of improvements could improve many of the buildings in the city, and could maintain relatively constant internal temperatures without constant input.

Uniquely qualified

Many people might assume that a city like New York would be a hard place to achieve a 90 percent reduction in carbon emissions, given that it is already one of the most efficient cities on a per capita basis. However, the biggest challenges will be cutting down on emissions from the transportation sector - an area still dominated by carbon-intensive oil. And that plays right to New York City's strengths, since the majority of residents do not own cars and the well-developed mass transit system offers an easy alternative.

All in all, Urban Green Council's report, "90 by 50: NYC can reduce its carbon footprint 90% by 2050," estimates that the city could accomplish this reduction at a cost of [around \\$167 billion](#), or roughly \$5 billion per year. While that might be an intimidating number, the improvements would also come along with around \$148 billion in reduced energy costs, bringing the net cost to less than \$20 billion, a much more promising figure.

The Paramus Post

New York City Can Mitigate Climate Change through Buildings and Infrastructure

By [Mel Fabrikant](#) Thursday, February 14, 2013, 07:25 PM EST

The country's largest city can feasibly reduce its carbon emissions 90 percent by 2050, according to a study released today by Urban Green Council. President Obama stressed the importance of building efficiency in his State of the Union, announcing a goal to cut energy waste from homes and businesses in half over the next 20 years. The timely study, 90 By 50, finds that by updating and streamlining the city's buildings and infrastructure, New York City can meet that goal and more, reducing its greenhouse gas emissions to the levels identified by scientists as necessary to contain climate change.

Issued in the wake of Superstorm Sandy and other unprecedented weather events that re-focused attention on building preparedness, 90 By 50 shows the dramatic role urban buildings can play in mitigating climate change. Buildings are New York City's greatest contributor to carbon pollution, producing 75 percent of its greenhouse gas emissions. The transportation sector accounts for another 21 percent. Climate scientists say carbon pollution must be reduced 80 percent worldwide by 2050 to ensure a safe, sustainable environment. To do the study, a virtual New York City was created using key building types. The model was then adjusted to improve future buildings using currently available technologies like improved insulation, the use of heat pumps, and transportation electrification. The result: a building sector that is essentially free of carbon pollution.

Environmental and urban leaders agree that our current infrastructure is unsustainable but disagree on the feasibility of finding a solution. 90 By 50 is the first study to tactically demonstrate how an American city can tangibly and affordably meet the challenges of climate change. "The buildings we live in can play a crucial role in the sustainability of society and the planet. This study shows us that an energy-efficient and innovative New York is possible—and necessary. If New York—the complicated nerve center of the country—can do this without breaking the bank, any city in the world can," said Urban Green Council Executive Director Russell Unger. The study assumes that buildings will remain functionally the same as today, without sacrificing physical comfort. All tactics tested are either currently available or reasonably foreseeable. The cost of the changes is neutral when the economy and other factors are considered.

About Urban Green Council Urban Green Council is the New York Chapter of the U.S. Green Building Council (USGBC). Its mission is to advance the sustainability of urban buildings through education, advocacy and research. The nonprofit is a trusted advisor to Mayor Bloomberg and the New York City government on building resiliency and efficiency. Urban Green Council recently convened the city's Building Resiliency Task Force in the wake of Superstorm Sandy and will release recommendations in June.



CRE Can Help Solve Climate Change

By [Rayna Katz](#) | New York
February 19, 2013

NEW YORK CITY—On the heels of President Obama’s state of the union address—in which he issued a call-to-action to cut energy waste from homes and businesses in half over the next 20 years—a new study points up the major role NYC’s CRE industry can have in this effort. The country’s largest city can feasibly reduce its carbon emissions 90 percent by 2050, according to the study, released Thursday by the **Urban Green Council**, the New York Chapter of the **US Green Building Council**.

Issued in the wake of Superstorm Sandy and other unprecedented weather events that re-focused attention on building preparedness, the timely study, called 90 By 50, finds that by updating and streamlining the city’s buildings and infrastructure, New York City can meet that goal and even exceed it. That’s because the changes would reduce the city’s greenhouse gas emissions to the low levels identified by scientists as necessary to contain climate change.

The study’s director, Richard Leigh, says in a statement, “New York City has been in the forefront of U.S. cities pursuing a sustainable future. But climate science tells us we must nearly eliminate greenhouse gas emissions by 2050 to contain climate change, and 90 by 50 sketches out one version of the road we must travel.”

Buildings are New York City’s greatest contributor to carbon pollution, producing 75 percent of its greenhouse gas emissions, according to UGI. The transportation sector accounts for another 21 percent. Climate scientists say carbon pollution must be reduced 80 percent worldwide by 2050 to ensure a safe, sustainable environment, the institute reports.

To do the study, a virtual New York City was created using key building types. The model was then adjusted to improve future buildings using currently available technologies like improved insulation, the use of heat pumps, and transportation electrification. The result was a building sector essentially free of carbon pollution, the release states.

Environmental and urban leaders agree that the city’s current infrastructure is unsustainable but disagree on the feasibility of finding a solution. 90 By 50, the release asserts, “is the first study to tactically demonstrate how an American city can tangibly and affordably meet the challenges of climate change.”

The study assumes that through 2050, buildings will remain functionally the same as today, without sacrificing physical comfort. UGI claims that all tested tactics are either available now or reasonably foreseeable. The institute describes the cost factor as “neutral, when the economy and other factors are considered.”



90 by 50 plan could reduce New York City's emissions by 90% by 2050

By Lloyd Alter
[Design](#) / [Green Architecture](#)
February 18, 2013

There is nothing like setting a dramatic target to get people's attention, and the [Urban Green Council](#) is certainly doing so, with their proposal to reduce New York City's CO2 emissions by 90% by 2050. What's more, they propose doing it by renovating and rehabilitating existing buildings with a series of measures that are achievable with today's technology, no silver bullets required. Some of the ideas they propose are absolute no-brainers and should be part of the building code right now; I am not sure about some of the others, and whether they have thought through all of the implications of scaling things up to New York City sizes. It's HUGE: we are talking about replacing 99 million windows, 5.7 billion square feet of insulation, 5.65 million residential units and 86,000 commercial buildings. Here's the plan:



Lower vision glass to 50% maximum

This is a serious no-brainer; there is no need for floor-to-ceiling glass, and it is actually uncomfortable in both summer and winter. Architects and builders like it because it is easy one-stop shopping, but it should just not be allowed. (See Allison Bailes' great article [A good window is still a poor wall](#))

Increase insulation on solid walls

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They are looking for an average of R-20, which isn't a huge stretch. Prepare for New York to turn into Stucco City, as they suggest that the exterior surface is preferable for insulating.

Owners of brownstone town houses and many other buildings with decorative facades will not want to utilize external insulation, but other options exist, starting with additional interior insulation. Interior insulation must be evaluated carefully, as not all masonry can withstand the increased temperature cycling that will occur if it is isolated from the interior.

There is no mention about the serious concerns some people have with the use of plastic foam insulation, which I have covered in [Polystyrene Insulation Doesn't Belong in Green Building](#) and [Why Plastic Foam Insulation Is Like a Twinkie: Lessons Green Builders Can Learn From Michael Pollan](#).

Incorporate triple glazing

Here again they are realistic and reasonable, suggesting that it can be done either through window replacement or by adding another layer of glass.

Add sunshades to south windows

I cannot imagine that this would do much at all, given how much shade there is in New York from other buildings. But I [do love nice shades](#).

The interaction of architectural measures

Here, they demonstrate a real understanding of the complexities of green building.

The levels of change we are examining in our models will raise eyebrows. Each of the proposed measures above calls for a level of insulation, air sealing, or glazing that is not currently regarded as worthwhile. If the measures were regarded in isolation in a typical contemporary building, there is truth to that. There is no point in adding insulation up to the R-20 level (over R-10) if heating and cooling loads driven by infiltration, ventilation, and equipment inefficiency are left at their current high levels. The last R-10 increment of insulation will do very little to the overall heating or cooling load, since the heat will be leaving or entering the building through those other modes.

However, the only path to a truly low-energy building is to reduce all loss pathways. When this is done, and all routes for unwanted heat loss or gain are treated as a unified whole, then each of the measures considered here will still make significant contributions to energy use reduction, even at these “extreme” levels.

Indeed, if the buildings are sealed so tightly, there are going to be all kinds of secondary problems such as moisture buildup and mold, so heat recovery ventilators are going to be needed in every unit.

Table 4.1: Building Shell and HVAC Measures										
Building Type	Airseal and isolate dwelling units, provide ERV	Airseal building, provide ERV	Lower vision glass to 50% max.	Increase insulation on opaque areas	Triple glaze all windows	Add 3' sunshades to south windows	Mini-split heat pumps	Ground source heat pumps	DRW heat pump operating in conditioned space	Heat recovery for DRW on air conditioners
1 or 2 Family House	✓			✓	✓	✓	✓		✓	✓
Row House	✓			✓	✓	✓	✓		✓	✓
Low Rise Residential	✓			✓	✓	✓	✓		✓	✓
Masonry High Rise Residential	✓			✓	✓	✓		✓	✓	✓
Window Wall High Rise Residential	✓			✓	✓	✓	✓		✓	✓
Low Rise Commercial		✓		✓	✓	✓		✓	✓	✓
Masonry High Rise Commercial		✓		✓	✓	✓		✓	✓	✓
Curtain Wall High Rise Commercial		✓	✓	✓	✓	✓		✓	✓	✓

© Urban Green

Heat pumps: Mini-splits and ground source

Here, the key proposal is to get off the central coal-fired central steam heating system and go to electric-based heat pumps. I wonder if this is a good idea.

Once buildings are insulated to R-20 and have triple-glazed windows, it isn't going to take much to heat and cool them. Mini-split heat pumps are proposed for residential units; these are essentially air conditioners that run backwards in winter, sucking heat out of the air and moving it to the interior. That is a serious number of condenser units sitting outside sucking a few calories of heat out of the winter air; I wonder if it could actually have an effect of changing the micro-climate, making New York warmer in summer and cooler in winter.

The idea of drilling the number of wells needed for a ground source system for all the larger buildings is beyond comprehension. Where would you put them all? Tom Rand's little [Planet Traveler Hotel in Toronto](#) took eight wells 350 feet deep.

And if you are in a City surrounded by rivers and oceans, why would you bother? Why not just do a deepwater system and let the Hudson River do the work?

Green buildings should be healthy buildings

There are other issues. Currently a lot of air is pumped into corridors to pressurize them; this ensures that smells from cigarettes and cooking don't migrate out from the units and annoy neighbors. It also controls smoke in case of fire. Fresh air comes in around the entrance door and leaks out the windows or the bathroom exhaust. Under this proposal, New York apartments will manage their moisture and smells with 5.65 million heat recovery ventilators. Simple, central, leaky systems are replaced with individual and complicated heat pumps and HRVs, all of which need maintenance and filter changes. I worry that it is all just too complex a system.

There are serious health implications if these systems don't work, if moisture builds up and mould starts growing. All of these foam insulations and caulks are full of flame retardants and VOCs and

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other chemicals that can build up if there isn't proper ventilation. In a lot of ways, leaky buildings are healthier buildings because of the high rate of air change.

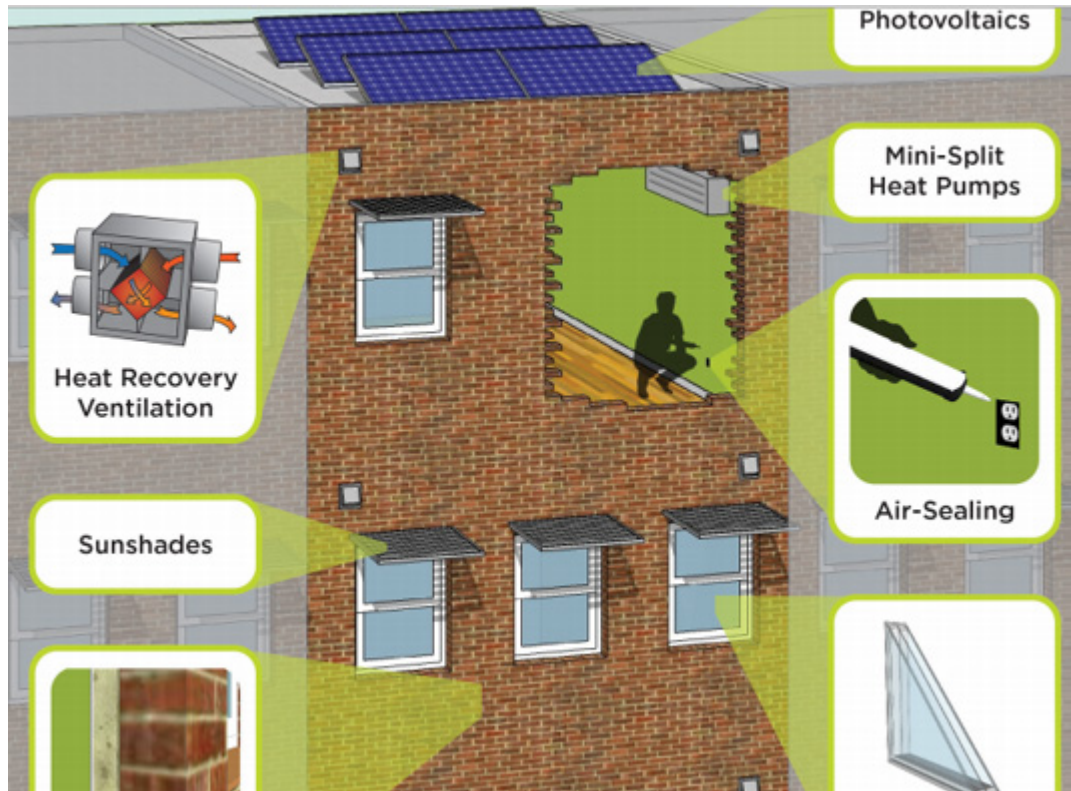
On the other hand, it is a bold, aggressive proposal that would create tens of thousands of jobs, would probably pay for itself in energy savings if they actually achieve the "unified whole", and would make New York a much greener, if much uglier, city of vinyl and stucco.

Fascinating reading from [Urban Green](#).



New Report Shows How NYC Could Cut 90% of Its Carbon Footprint by 2050

by Taz Loomans, 02/18/13



With all the dire predictions about climate change in the news, it's easy to start thinking that the problem is too large to even begin to untangle. But a new report released by the [Urban Green Council](#), the New York Chapter of the U.S. Green Building Council, says otherwise. According to the study, entitled "90 by 50", New York City could cut 90% of its carbon emissions by the year 2050 using technologies we have today and without breaking the bank.

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New York has been working diligently towards its planNYC goal to reduce carbon emissions by 30% by 2030. But that number is not nearly enough according to recent studies that show that countries need to reduce emissions by 80% in order to combat global warming effectively. According to “90 by 50”, New York has a shot at reducing its carbon footprint by a whopping 90% largely by focusing on their biggest polluter – **building energy consumption**.



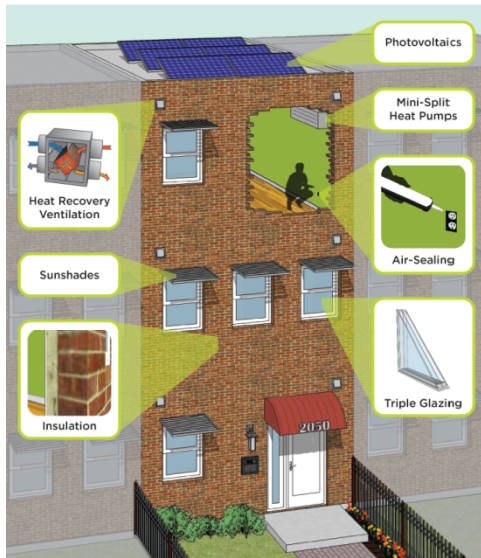
Seventy-five percent of the readily measured carbon emissions in New York City come from buildings and according to 90 by 50, here are three steps the city could take to reduce these emissions. The first is to eliminate the aging and inefficient steam heat system in buildings and replace it with electric heat. The second step is to power the electric heat with renewable sources. The third step focuses on energy efficiency and suggest ideas like requiring triple pane windows and limiting the amount of glass to only cover 50% of a building.

But New York has to do more than just decrease its building energy consumption to achieve a 90% reduction in emissions by 2050. Transportation accounts for 21% of the city’s total emissions. Electrification of buses along with an **expansion of rail**, both commuter and freight, would go a long way in reducing the pollution caused by transportation in New York.

And how much are all these measures supposed to cost over the next 37 years or so? It’s estimated that they will cost around \$167 billion in today’s dollars, which works out to be around \$5 billion a year. But the estimated energy savings are expected to yield upwards of \$147 billion, netting a cost closer to \$20 billion, which is a bargain if you consider that it cost \$50 billion to clean up the **damage from Hurricane Sandy**.

ECO ANCHOR NYC

Urban Green Council Releases 90 by 50 Plan; Says NYC Can Reduce Its Carbon Footprint 90% By 2050



The greatest obstacle to a responsible approach to climate change mitigation is a sense that the problem is insoluble. Urban Green Council's latest research report, *90 By 50*, demonstrates that the emission reductions required are in fact possible using technologies that are known and in almost all cases currently available, and that the cost is manageable from a citywide perspective.

New York City has undertaken many greenhouse gas reduction programs to serve the planNYC goal of reducing the city's emissions 30 percent by 2030. While largely successful, they don't go nearly far enough. To ensure a global environment in which human society can bring security and prosperity to all its members, we must dramatically reduce carbon pollution by 2050. To meet this goal, a reduction of 90 percent in the readily measured fraction of New York City's emissions is appropriate.

The building sector is the source of 75 percent of New York City's greenhouse gas emissions. *90 By 50*'s modeling of eight typical building types shows that heating and cooling loads can be reduced through retrofit measures to a point where all thermal loads can be met by heat pumps, eliminating building fuel use. The resulting electric energy used in 2050, supplied by carbon-free sources, will be slightly more than today's, while peak demand will increase significantly. Over the period examined, the savings from energy use reductions will be comparable to the amortized cost of the improvements.

In the transportation sector, electrification and the expansion of mass transit and freight rail, as well as the latest federal fuel economy standards, will allow total residual carbon emissions to drop by 90 percent. Waste, wastewater, and other smaller sectors are also included in the analysis.

To learn more about the study, attend **90 by 50: A Path to Deep CO2 Emissions in NYC** on February 28 at Con Edison.

IN THE NEWS

Slate February 13, 2013

New York Times February 14, 2013

DOWNLOAD the full report.

VIEW the full report online.

(Released February 14, 2013.)

Urban Green Council thanks the Doris Duke Charitable Foundation for funding this important initiative.

Forbes

ENERGY | 2/22/2013

By William Pentland, Contributor

New York City's 90x50 Vision: Green Sleight of Hand?

New York City could reduce greenhouse gas (GHG) emissions by 90% at a modest cost by 2050, according to the 90x50 report released last week by the Urban Green Council.

The report claims to “demonstrate that the extreme emission reductions required to minimize climate change are in fact possible [in New York City] using technologies that are known and in almost all cases currently available, and that the cost is within reasonable bounds.”

Please correct me if I am wrong, but I believe it does no so such thing.

The Council explains that New York City could reduce GHG emissions by 90 over the next 37 years by “shifting all building loads to electricity, and utilizing carbon-free electricity.” In other words, the 90x50 vision presupposes that electricity provided by the conventional electric grid in New York City will be produced by “carbon-free sources.” That is a whopper of an assumption.



That this massively important assumption has virtually no basis beyond one or citations only becomes clear in the last two pages of the study, which are quoted from below at length:

In sum, our modeling of a future involving deep but entirely practical retrofits of buildings and mode switching and efficiency improvements in transportation shows that New York City can get by on slightly more electric energy than it is using now, about 57 TWh gross and 46 TWh net of PV production on buildings.

Under the less rigorous scenario with higher infiltration, gross electric energy needed would rise to 60 TWh, and the net to about 49 TWh.

We have indicated that about 57 TWh of carbon-free power are needed, of which rooftop photovoltaic panels will supply 11 TWh. A serious study of sources for the remaining power is beyond our scope, and, on a larger scale, at least two such studies have already been carried out. Instead, we list several options with brief comments.

Maintain the roughly 19 TWh of carbon-free power the Inventory reports is currently used by New York City. That will leave 27 TWh, all of which can be supplied by:

» 2600 4.0 MW wind turbines, occupying 35 to 40 square miles, either upstate or off shore, or

» 86 million square meters of photovoltaic panels with a footprint of 66 square miles, much of which could be on the parking lots, rail yards, and highways included in New York City's 350 square miles, or

» 3 or 4 new 1000 MW nuclear power plants (if cost, siting, and waste issues can be resolved), or

» Increased hydropower from Quebec (transmission lines are under construction now), or

» Any combination of the above.

• Also:

» Tidal power is proving itself but remains a development project with modest local potential.

» Solid waste combustion may be able to supply the steam system, cutting electric loads.

This brief survey indicates that supplying carbon-free electric energy to New York City in 2050 is plausible. Far more detailed study is clearly needed.

Urban Green Council, are you serious?

Forbes

ENERGY | 2/22/2013

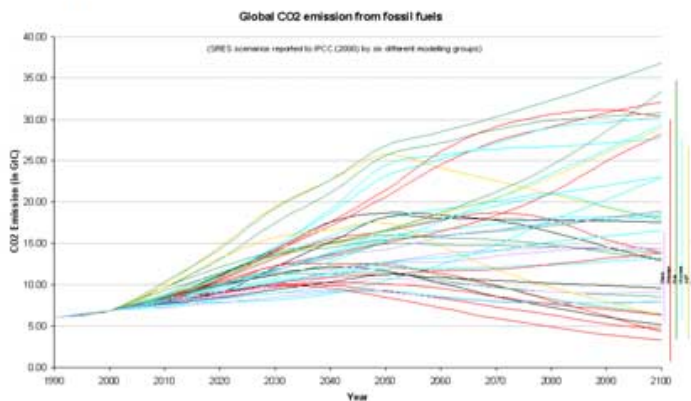
By William Pentland, Contributor

Rethinking Our Response to Climate Change: Carbon Wedges 2.0

New York City could cut emissions by 90% by 2050 by implementing a portfolio of energy reduction measures using existing technologies, according to a report released last week by the Urban Green Council.

The Council’s underlying arithmetic is emblematic of the prevailing portfolio-based approach to climate change mitigation – namely, strategies for reducing GHG emissions.

IPCC 10 years after "we are confident that the uncertainties can be reduced..."



The so-called “stabilization wedges” concept was introduced nearly a decade ago by two Princeton professors, Rob Socolow and Stephen Pacala, in a paper published in *Science*, “Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies.”

The wedges paradigm, which provides a framework for formulating emissions reduction strategies based on currently available technologies, quickly became the gold standard in the field of climate change mitigation. And for good reason. It was (and still is) a very effective and pragmatic way to package discrete mitigation strategies into a single platform, which could be optimized in much the same way that investment portfolios are optimized.

If Superstorm Sandy taught us anything, it was that mitigation by itself will neither prevent climate change from wreaking havoc on society nor protect us when it does. Indeed, climate change mitigation measures may make the damage and disruption caused by climate change considerably worse in some circumstances. Pro-active adaptation to climate change – or, strategies for enhancing society’s ability to cope with the negative effects of climate change – begins with breaking down the mitigation stovepipe.

The climate system is not a stovepipe and any policy response to climate change that pretends otherwise is likely to be the road to ruin. This has vast implications for energy and urban planning protocols, including the Urban Green Council’s 90×50 vision.

By framing decisions and objectives narrowly, the wedges paradigm (at least as applied in scores of analyses like the 90×50 report) prevents robust consideration of the complexity and uncertainty inherent in responding to climate change.

By way of example, imagine choosing between two policy options – A and B – for responding to the threat of global warming. Option A would reduce GHG emissions by 90% by 2050, but only if the future unfolded as anticipated. Option B would reduce GHG emissions by 70% by 2050, but would do so across a range of possible futures. A wooden application of the wedges model would prioritize the former over the latter.

In Power to the Edge, David Alberts and Richard Hayes, leading U.S. military strategists at the U.S. Department of Defense’s Command and Control Research Program, emphasized the shortcomings of optimization strategies:

This fixation on optimality often results in the selection of an option that sacrifices agility in the hopes of achieving the best possible result in the current case. For example, such

options include the selection of a military option that will work if an adversary does what is expected, a network that has only the links that are expected to be used, or a process that restricts participation, but is fast. When things go right, they go very right. When things do not go as anticipated, they may not work at all. This form of gambling is not a good bet

The same can be said – and said emphatically – about the prudence of gambling in this form in the context of climate change.

By deepening reliance on the conventional electric grid and eliminating the use of natural gas in New York City buildings altogether, the Council’s mitigation strategies would likely exacerbate the vulnerability of New York City’s energy systems to extreme weather and other adverse impacts of climate change.

In 2007, the Intergovernmental Panel on Climate Change concluded that: “It is essential to look at how the various components of the energy-supply chain might be affected by climate change . . . to ensure that any mitigation programs adopted now will still function adequately if altered climatic conditions prevail in the future.”

“The tradeoffs between resilience and efficiency are seldom acknowledged in the planning process,” P. H. Longstaff, an associate professor at Syracuse University, concluded in an essay published by George Mason University’s Center for Infrastructure Protection.

Rather than masking the trade offs between efficiency and redundancy, the wedges should illuminate them.

PLANETIZEN

Could New York be Carbon-Free by 2050?

Thursday, February 21, 2013 - 6:00am PST by [BORAMICI](#)

A new report shows that New York City could be 90 percent carbon-free by 2050, "without breaking the bank," if it upgrades heating systems and transportation to renewable electricity, reports Taz Loomans.

"90 by 50" is a new report released by the Urban Green Council, the New York Chapter of the US Green Building Council (USGBC).

The numbers refer to how drastically New York City could cut its carbon footprint in the next 38 years by switching to renewable-sourced electricity for heating buildings and by reducing the amount of heat that escapes them.

Although inefficient buildings contribute to 75 percent of the city's carbon emissions, 21 percent come from inefficient freight and passenger rail and non-electric buses. The city could revamp its building and transportation systems by the year 2050, cutting its carbon emissions by 90 percent, for a projected net cost of only \$20 billion.

Full Story: [New report shows how NYC could cut its carbon footprint by 90% by 2050](#)

New York Real Estate Journal Network

Urban Green Council releases study

February 26, 2013

New York, NY The country's largest city can feasibly reduce its carbon emissions 90% by 2050, according to a study released today by Urban Green Council.

President Obama stressed the importance of building efficiency in his State of the Union, announcing a goal to cut energy waste from homes and businesses in half over the next 20 years. The timely study, 90 By 50, finds that by updating and streamlining the city's buildings and infrastructure, N.Y.C. can meet that goal and more, reducing its greenhouse gas emissions to the levels identified by scientists as necessary to contain climate change. Issued in the wake of Superstorm Sandy and other unprecedented weather events that re-focused attention on building preparedness, 90 By 50 shows the dramatic role urban buildings can play in mitigating climate change.

Buildings are New York City's greatest contributor to carbon pollution, producing 75 percent of its greenhouse gas emissions. The transportation sector accounts for another 21 percent. Climate scientists say carbon pollution must be reduced 80 percent worldwide by 2050 to ensure a safe, sustainable environment.

To do the study, a virtual New York City was created using key building types. The model was then adjusted to improve future buildings using currently available technologies like improved insulation, the use of heat pumps, and transportation electrification. The result: a building sector that is essentially free of carbon pollution.

Environmental and urban leaders agree that our current infrastructure is unsustainable but disagree on the feasibility of finding a solution. 90 By 50 is the first study to tactically demonstrate how an American city can tangibly and affordably meet the challenges of climate change.

"The buildings we live in can play a crucial role in the sustainability of society and the planet. This study shows us that an energy-efficient and innovative New York is possible—and necessary. If New York—the complicated nerve center of the country—can do this without breaking the bank, any city in the world can," said Urban Green Council Executive Director Russell Unger.

The study assumes that buildings will remain functionally the same as today, without sacrificing physical comfort. All tactics tested are either currently available or reasonably foreseeable. The cost of the changes is neutral when the economy and other factors are considered.



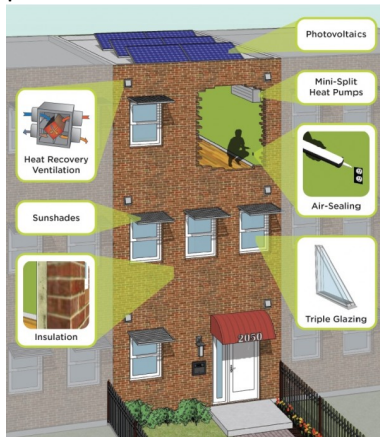
NYC's '90 by 50' Plan Sets High Bar For CO2 Reduction

by [Randy Woods](#)

March 2, 2013

[New York](#) is a city made of bold statements and gestures that are sometimes backed up by bold deeds. For this reason, the Big Apple is the focus of the [Urban Green Council's](#) latest plan to reduce the [CO2 emissions](#) in the city by 90 percent by the year 2050, mostly through the use of better building materials and techniques.

Many emissions reductions projects have been planned in many others cities before with middling success. What makes this long-range plan, called "[90 by 50](#)," a bit different is that it is based almost entirely on green building technology that is currently feasible and somewhat affordable. As the report says, "The greatest obstacle to a responsible approach to climate change mitigation is a sense that the problem is insoluble."



Some of the common emissions-reduction elements addressed in the "90 by 50" proposal. Image via Urban Green Council.

New York already has a plan in place called [plaNYC 2030](#) that calls for a 30 percent reduction in CO2 emissions by 2030. However, the Urban Green Council says the goals are no longer bold enough for what is needed to make a dent in the city's air quality. The report analyzes several typical residential and commercial building types in the city – single-family homes, row houses, low-rise and high-rise masonry, high-rise curtain wall glass, etc. – and finds that the ambitious 90 percent reduction target can be met mostly through renovations of existing buildings.

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“The building sector is the source of 75 percent of New York City’s greenhouse gas emissions,” said the Urban Green Council in its introduction to the 90 by 50 report. “Heating and cooling loads can be reduced through retrofit measures to a point where all thermal loads can be met by heat pumps, eliminating building fuel use.”

The effort needed to make these improvements, of course, will be daunting. A total of 5.65 million residential units and 86,000 commercial buildings would qualify for the retrofits needed. Some of these will include:

- Replacing 99 million windows with energy-efficient [triple-paned windows](#)
- Adding of 5.7 billion square feet of [insulation](#) with an average rating of R-20
- Installing [sunshades](#) on all south-facing windows to reduce solar gain
- Installing [rooftop photovoltaic cells](#) wherever possible
- Reducing vision glass to no more than 50 percent on new curtain-wall construction
- Increased [air sealants](#) on windows, doorways and other thermal bridge areas to prevent heat loss
- Transitioning from central steam heating to [mini-split electric heat pumps](#) for residential units
- Adding heat recovery ventilators in residential units to control moisture buildup, add fresh air to the living environment and prevent mold growth caused by extra insulation and sealants

“The resulting electric energy used in 2050, supplied by carbon-free sources, will be slightly more than today’s, while peak demand will increase significantly,” the report says, after these improvements are made. “Over the period examined, the savings from energy use reductions will be comparable to the amortized cost of the improvements.”

Other non-building parts of the 90 by 50 proposal include the electrification and expansion of mass transit and freight rail, tougher federal fuel economy standards, and a greater emphasis on waste reduction and wastewater treatment.

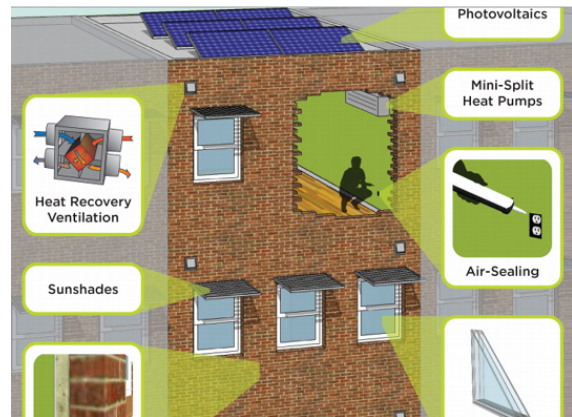
To download the full report, go to the Urban Green Council’s [90 by 50 page](#).

90 by 50: Is It Really Possible to Achieve?

BY ANNIE MURRAY ON FEBRUARY 20, 2013 · IN ARCHITECTURE, GREEN BUILDING, SUSTAINABILITY

The Big Apple is doing it big yet again in their push for sustainability. This week, New York goes beyond their already ambitious plan to reduce carbon emissions by 30% by 2030, which they called PlaNYC 2030. Though they have been making progress since the implementation of their efforts in 2007, recent studies show that we will only be able to fight global warming effectively by reducing carbon emissions by 80%. While some might find this number incredibly intimidating and be inclined to give up the struggle completely, the Urban Green Council (New York's chapter of the U.S. Green Building Council) simply regrouped and redirected their efforts towards the new challenge at hand.

The Urban Green Council plans to go above and beyond the 80% reduction and is aiming for a 90% reduction of New York's carbon footprint by 2050, a mere 37 years in the future. To achieve this, their outlined "90 by 50" plan focuses on the biggest polluter in New York City: building energy consumption, which contributes to a whopping 75% of their measured carbon emissions. The plan puts the spotlight on can be broken down to 3 simplified steps:



- 1) Eliminate the old, inefficient steam heat system in buildings, to be replaced with electric heat.
- 2) Power this electric heat with renewable resources.
- 3) Increase the requirements on energy efficiency with items such as triple pane windows and glass only covering 50% of the buildings.

Although only three steps long, the plan will impact buildings on a huge scale, and calls for replacing 99 million windows, 5.7 billion square feet of insulation, 5.65 million residential units and 86,000 commercial buildings. They will also try to eliminate building fuel use by having all thermal loads met by heat pumps, incorporate triple glazing for windows, increase insulation on solid walls, use more sun shades, and manage building moisture with over 5.65 million heat recovery ventilators.



In addition to the green remodeling of existing buildings, New York will also have reconfigure their transportation (21% of emissions) with ideas like the electrification of buses and the expansion of railway transportation. So how much are all of these changes going to cost? Right now, the estimated present value cost is about \$167 billion, or \$5 billion a year. This cost is lower than it could have been, due to the fact that most of the proposed technologies are readily available and the costs for using them relatively manageable. Also, the energy savings are anticipated to be more than \$147 billion, so the net cost would only be \$20 billion. Considering that this is about the cost of cleaning up BP's Gulf oil spill in 2010, it's a price we should be willing to pay to combat global warming.

In case anyone happens to be in the New York area, take the opportunity to attend the Urban Green Council's event coming up on February 28. You will be given the opportunity to hear from several speakers, including the lead

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researcher behind the bold “90 by 50” plan, Richard Leigh. Any questions on the necessity for, viability of, and means by which to achieve the 90% reduction will be answered, so check it out!

See Also:

- <http://inhabitat.com/nyc/new-report-shows-how-nyc-could-cut-a-whopping-90-of-emissions-by-2050/nyc-emission-reductions-by-90-pct-2/>
- <http://www.urbangreencouncil.org/90by50>
- http://www.urbangreencouncil.org/UGCInteraction?key=mPbvDtytnrVNN4BZpFIFLA_3D_3D
- http://www.treehugger.com/green-architecture/urban-green-council-shows-way-reducing-new-york-citys-emissions-90-2050.html?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+treehugger%28Treehugger%29

Civil Engineering

THE MAGAZINE OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS

Report Highlights Path to Lower Emissions

By Jenny Jones

A new report shows that New York City can use existing technologies to reduce its greenhouse gas emissions by 90 percent over the next 37 years.

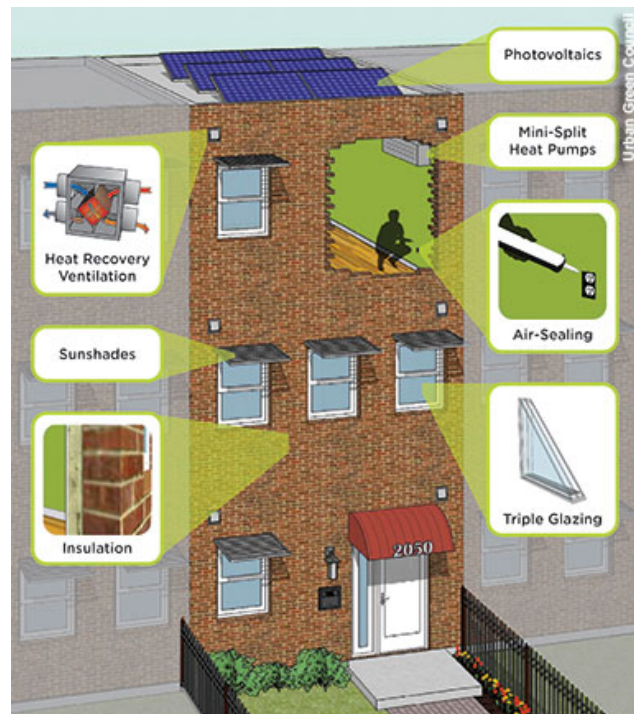
March 5, 2013—Many climate scientists say that in order to ward off the devastating effects of climate change, developed countries will have to reduce their greenhouse gas emissions by 80 to 90 percent by 2050. That percentage is so high that many people assume it is either impossible to achieve or that elaborate technologies must first be developed. But a recently released report shows that when it comes to the largest city in the United States, not only is it possible to slash emissions by 90 percent over the next 37 years, but also that the reductions can be accomplished using fairly simple techniques.

Urban Green Council, the New York chapter of the U.S.

Green Building Council, released the report, entitled *90 by 50*, on February 14. The publication outlines the results of a modeling study carried out by Urban Green Council showing that New York City could reduce its emissions by 90 percent by 2050 using technologies that for the most part are widely available. It also calls New York City's PlaNYC, an initiative aimed at reducing emissions by 30 percent by 2030, a good first step toward addressing climate change, but it says more must be done.

Richard Leigh, P.E., LEED AP, the research director for Urban Green Council, says that the goal of reducing emissions by at least 80 percent can be so overwhelming that people tend instead to set more easily achievable targets, for example, the one in PlaNYC. "We've got to reduce emissions, and many people believe that—accept it—but just don't see how we can possibly do it," Leigh says. "So we thought it was important to step up to the plate and show that for this great big metropolis it was in fact a technical and economic possibility."

Seventy-five percent of New York City's emissions come from its buildings, so the report focuses on upgrading buildings to reduce emissions overall. "People don't always realize how much buildings impact their lives—their health, the environment—but in dense urban cities, [buildings] are the environment," says Russell Unger, the executive director of

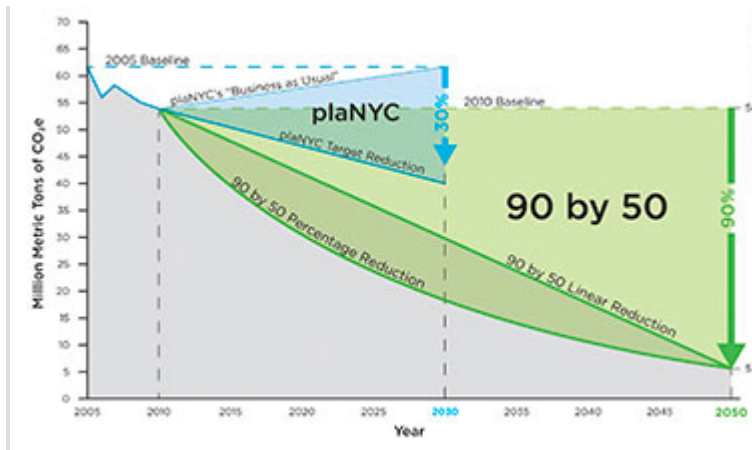


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Urban Green Council. He adds that every city has a different profile and that in such cities as Los Angeles transportation accounts for most of the emissions, but in “a place like New York, the story’s all about the buildings.”

Urban Green Council developed eight building models to represent various city structures. The models were designed to initially be as inefficient as the buildings that exist in the city today and to have similar emission levels, Leigh says. The researchers then began improving the models using such common techniques as sealing air leaks, adding insulation, installing sunshades and triple-pane windows, incorporating photovoltaic cells, and installing mini-split-system and ground-source heat pumps and heat recovery ventilation systems. As a result of the upgrades, the buildings’ emissions decreased by 55 to 65 percent, Leigh says.

To reduce their emissions further, the models were connected to electricity sources that do not emit greenhouse gases. “You’ve really reduced your energy load, and then you supply what’s remaining with renewable power. Some of it will be photovoltaics, and the rest of it will be from the grid,” Unger explains. “Right now, our grid is forty percent carbon free in New York City, so you’d have to find ways to make the rest carbon free.” The researchers didn’t examine alternative electricity sources as part of their study, but the report includes a list of possible carbon-free sources, including windmills and nuclear power plants.



While upgrades that help buildings use less energy can save money in the long term, the initial costs can be high. Unger says those costs can be reduced if the equipment is upgraded at the time of its necessary replacement. “There are some places where buildings, to hit these numbers, would need to do retrofits they wouldn’t do otherwise, particularly insulating their walls and sealing within their walls,” Unger says. “But a lot of . . . the equipment will be replaced between now and 2050, so you upgrade it [then].”

New York City has a plan in place to reduce emissions by 30 percent by 2030, but an Urban Green Council report suggests the city could cut emissions by 90 percent by 2050. Urban Green Council

In addition to reducing building emissions, New York City would have to cut its transportation emissions to meet the 90 percent goal. The report suggests reducing those emissions in part by reintroducing trolleys. “Trolleys these days are like buses: they have rubber tires and can go anywhere on the road, but they get their power from a wire overhead,” Leigh says. “If you think that’s an odd technology, go to Boston. They use them throughout the city and throughout Cambridge.” The large number of electric cars expected in the future will be helping matters, and the report assumes that all other vehicles would meet the new federal fuel emission standard, which

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calls for an average of 54.5 miles per gallon by 2025. “We just assume that by 2050 [everyone] would be complying with the 2025 fuel efficiency standard,” Leigh says. “So a lot of our emission savings just come from current law.”

While *90 by 50* offers many suggestions for significantly reducing emissions in New York City, Unger and Leigh say it is by no means the only path to that end. “Our goal is to address some of the malaise out there, the sense that this is so overwhelming that it’s impossible to do,” Unger says. “We hope to just change the general perspective about the possibility of this and also start pointing the way toward what might be involved in doing it.” Unger adds that the issue will require a great deal more study, but he hopes the report gets people talking. “We think that this is, hopefully, going to be changing the dialogue in policy circles and getting people thinking toward where we ultimately want to head,” he says. “We’re showing a path, not *the* path.”

Sustainable Building Advisor

NYC'S Urban Green Council Releases Ambitious "90 BY 50" Plan for City

Tucker Warner | March 6th, 2013

New York City is, well... New York City – one of the most influential cities on the planet – the “beau ideal.” So, when the [URBAN GREEN COUNCIL](#) (UGC) officially announced its new plan to drastically reduce the city’s carbon emissions, the world was listening.

Until recently, the city had been working on “[PLANYC](#)” – an initiative that called for a 30% reduction in city wide greenhouse gas emissions by 2030 – a quite ambitious goal in itself. However, more recent opinions from climate scientists indicate that perhaps this goal does not go far enough. According to many climate scientists, it is imperative that the world reduce global greenhouse gas (GHG) emissions at least 80% by 2050 in order to “ensure a global environment in which human society can bring security and prosperity to all its members (UGC).”

With developing nations striving to reach the same quality of life that Americans already enjoy – through a parallel process of industrialization and environmental externality – it is up to the developed world to take responsibility of an even larger portion. For this reason, NYC is committing to reducing its GHG emissions 90% from today’s levels by 2050 – a campaign it is calling “[90 BY 50](#),” and one of the boldest pledges by any municipality to date.

The [FULL 51 PAGE REPORT](#) (released February 14th, 2013) is not meant to be a detailed blueprint for the next 37 years. Instead, it was written to show, in a fairly broad sense, what the city must do and why it must do it. The report states that “extreme emission reductions required to minimize climate change are in fact possible using technologies that are known and in almost all cases currently available, and that the cost is within reasonable bounds (UGC).”

The plan focuses mainly on buildings, which account for a staggering 75% of the New York City’s GHG emissions. Its findings are based on the modeling of eight basic building types that are representative of the city as a whole. The simulations show that heating, cooling, and hot water loads can be met by carbon-free sources, such as solar photovoltaics, if the city’s existing buildings are retrofitted with better air sealing, heat recovery ventilation, triple pane glazing, window shading for summer sun, and additional insulation. The report offers great detail into the methodology surrounding its calculations and draws conclusions based on scientific data and real world examples.

The study assumes that buildings would require the same general functions, and that occupants would desire the same level of comfort (although air conditioning loads were predicted to increase dramatically as the planet warms). Improvements in efficiency and electrification of the transportation sector are expected to help curb urban carbon emissions by at least 10%.

“The Big Question” – What Will It All Cost?

To answer this, the team calculated the retrofit cost of the eight model building types and then extrapolated this value across the entire city and over the course of 37 years. They eventually came up

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with quite an enormous net present cost of \$94 billion. However, this figure alone doesn't tell the full story. They then calculated the money that would be generated by a much more energy efficient building fleet and came up with a net present savings of \$87 billion. Putting these together leaves us with a total cost of around \$7 billion over 37 years – ahhh much more reasonable. Additionally, this cost evaluation does not monetize the many qualitative benefits that could be associated with a carbon free city.

Such an extreme commitment does not come without controversy and skepticism. Many questions arise whenever we set forth without precedent. Is this a reasonable goal? What policies need to be put in place to ensure we reach it and, what if we don't? Will other cities follow suit and will it all be soon enough?

The report and its authors do not claim to have all the answers – at least not now. There will be unanticipated obstacles and failures. But there might also be unexpected successes and new technologies that will help to make up for the areas in which we fall short. It is clear that the issue of climate change is very real and demands our attention. The “90 by 50” plan is both shockingly bold and incredibly ambitious, and why not?

Tucker Warner recently moved to the Bay Area from New York City to pursue a career in sustainable design. He graduated from Northeastern University in 2011 with a degree in Structural Engineering and Environmental Science and has since taken graduate architecture courses in environmental systems design. Tucker is currently participating in the Winter 2013 SBA Program, and is a regular contributor to the SBA Blog.
